# GAS JOURNAL

## LIGHT . HEAT . POWER . BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

Vol. 202. 85th Year. LONDON, APRIL 5, 1933. No. 3646. Price 1s.



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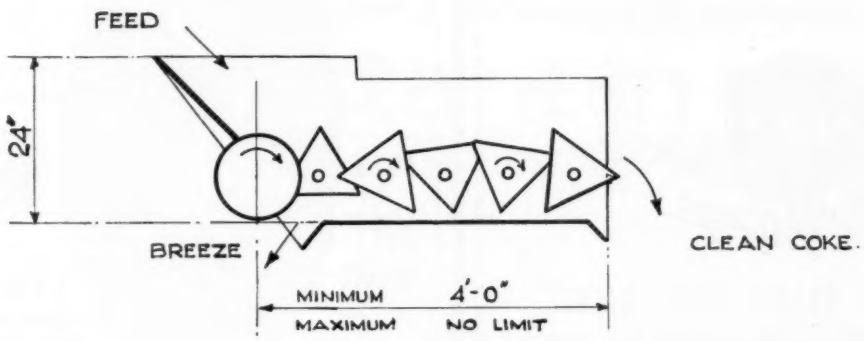
(INCORPORATING THE C.C.L. SCREEN & OTHER PATENTS)

NO BREEZE CHUTES NO LOST HEADROOM

POSITIVE DELIVERY OF BREEZE ONLY 24" BELOW FEED




HIGHLY EFFICIENT A PROVED SUCCESS

ANY CAPACITY FROM 15 TONS PER HOUR UPWARDS

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**GEORGE GLOVER'S PRE-PAYMENT METER.**

**"CHELSEA TWO"**

The Meter that may be used:—

1. For PENNIES AND SHILLINGS.
2. For PENNIES only.
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The consumer has a FREE CHOICE of using either pennies or shillings. No alteration to meter mechanism is involved. Either coin can be inserted at will and the appropriate volume of gas delivered. "Chelsea Two" Meters can be easily restricted, if required, to take PENNIES ONLY or SHILLINGS ONLY. No other gas meter offers all three advantages.

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Immediate delivery.

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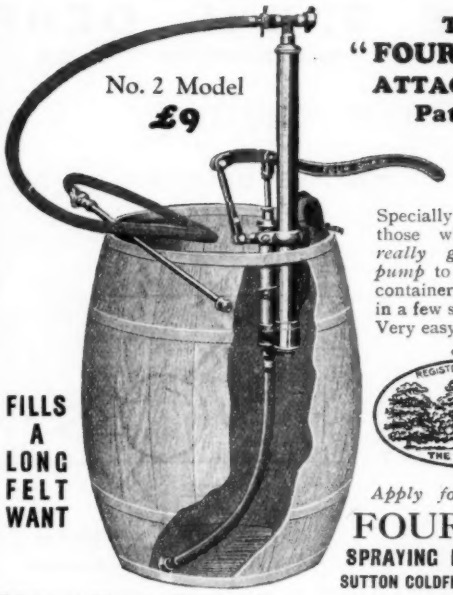
***for easy*** **Limewashing and Liquid Cement Spraying in Hot Vertical Retorts**



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**£9**

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**The "FOUR OAKS" ATTACHABLE Pattern.**

*As supplied to many leading Gasworks.*

Specially designed for those who require a *really good powerful pump* to fix to existing container. Can be fitted in a few seconds. Very easy working.

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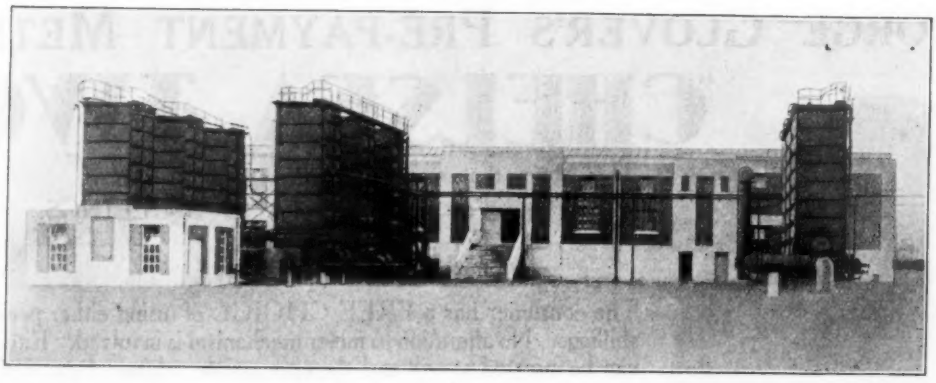

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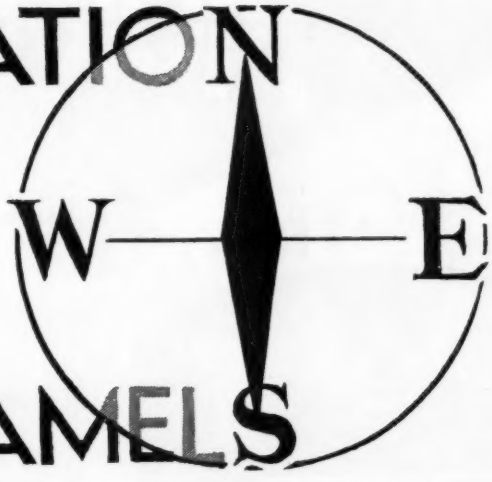


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Pursue the safest course and place your orders for heat-resisting enamelware with an undertaking which specializes in this class of work.

"Constancy" is our watchword, and our linings, trays, and splash plates are noted for their excellence of quality, workmanship, and design.

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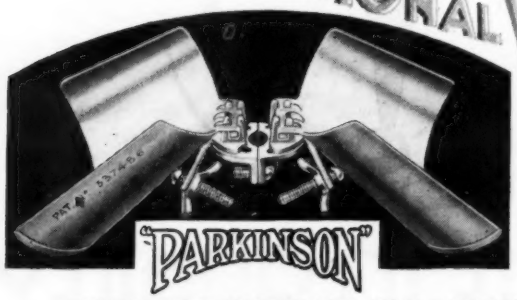
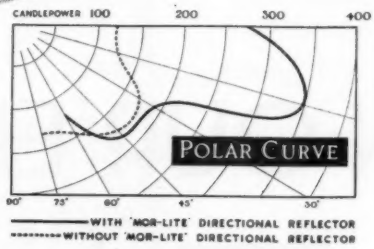
THE

STREET MOR-LITE PATENT LIGHTING

DIRECTIONAL REFLECTOR

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5. Wings lift off instantly for Lamp Cleaning, and are replaced without disturbing adjustments.

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Estd 1858.

WE UNDERTAKE TO MANUFACTURE SILICA BLOCKS TO ANY SPECIFICATION REQUIRED.

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Leaves Count
NEW GAS PLANT OF UNIQUE DESIGN
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HITLER GERMA CHANCELLOR
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**and we have now received an order for a 50% extension to the above installation**

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**CONSUMERS' METERS** IN ALL SIZES

PREPAYMENT and ORDINARY

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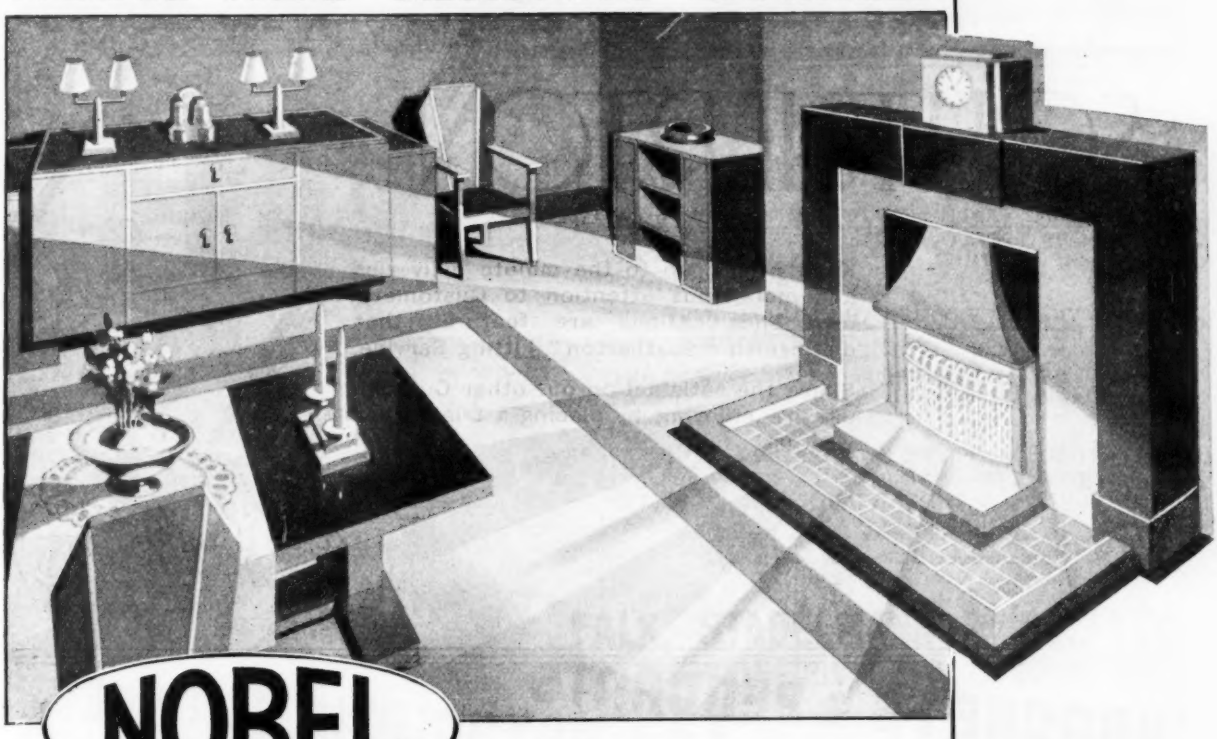

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Keen prices, up-to-the-minute deliveries and meticulous attention to Customers' own specifications are features that distinguish "Southerton" Fitting Service.

Share the satisfaction our other Customers are enjoying by placing a trial order with us.

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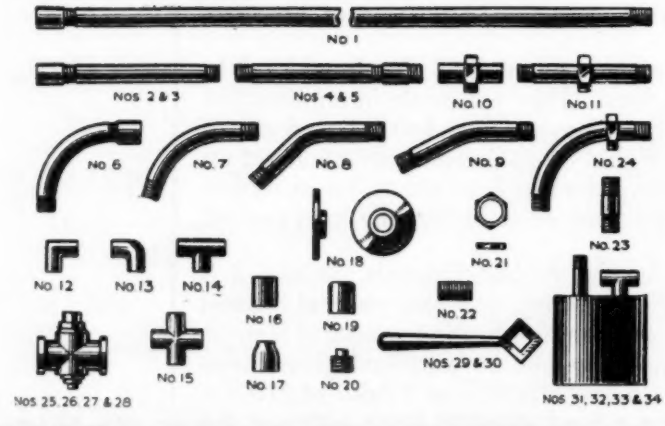
Tubes and Fittings for Gas Services

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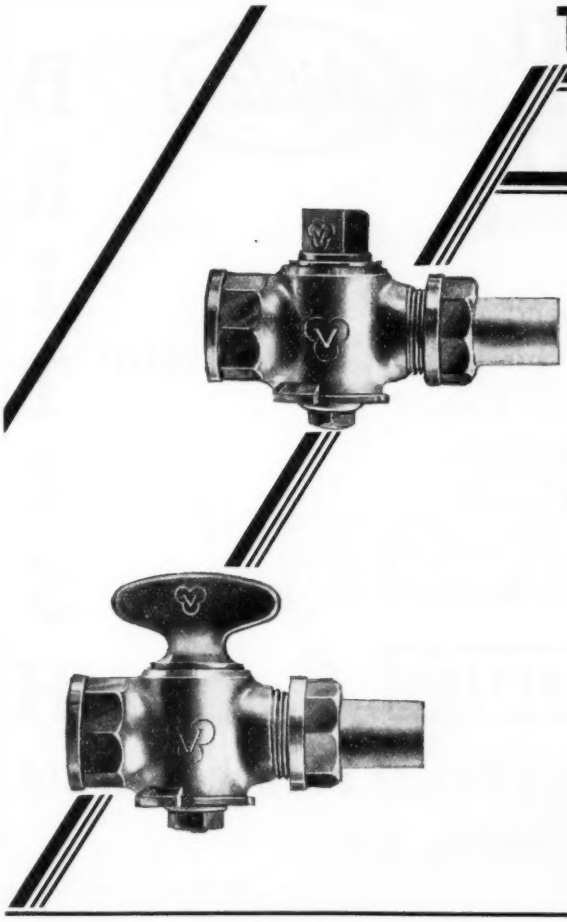
# MAIN COCKS



## MADE FROM HOT PRESSED BRASS

MERE WEIGHT DOES NOT CONSTITUTE STRENGTH. OUR NEW SUITE—MADE BY A PATENTED PROCESS—IS NOT SO HEAVY AS CAST COCKS OF CORRESPONDING SIZES,

BUT THEY HAVE SOLID PLUGS—FULL WAY, AND ARE ACTUALLY STRONGER.

THE "SHUT OFF" RESULTING FROM THE PATENT IN MANUFACTURE GIVES MAXIMUM MARGIN OF SAFETY.

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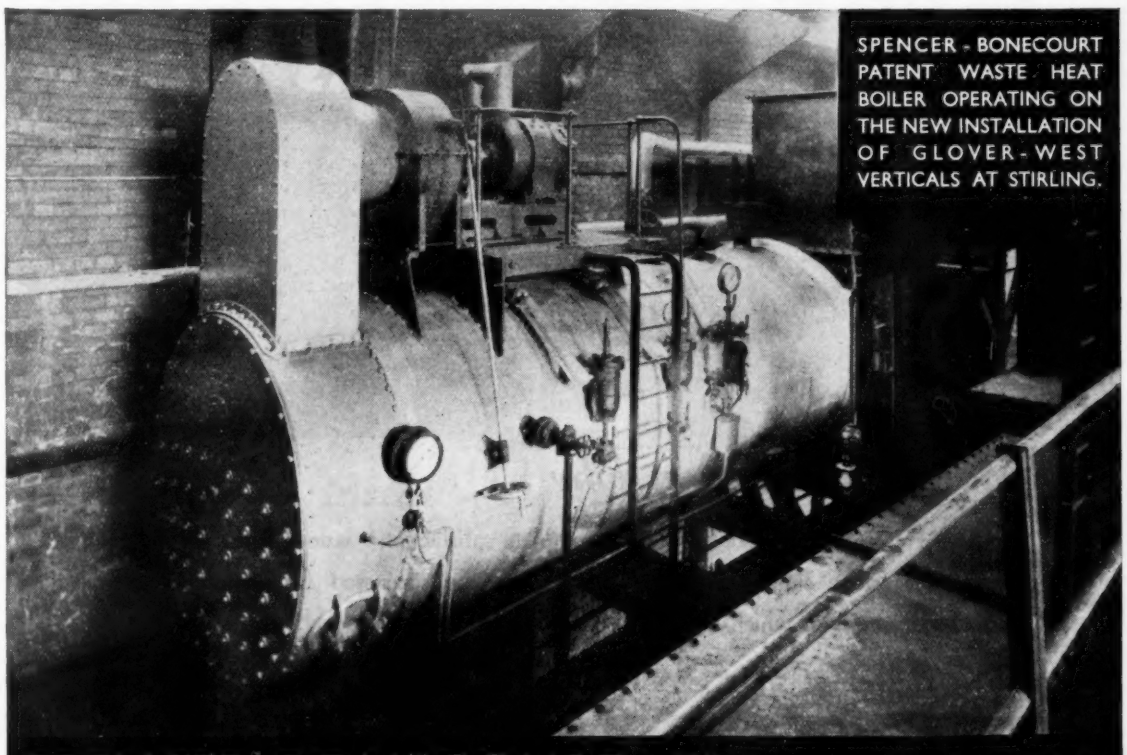

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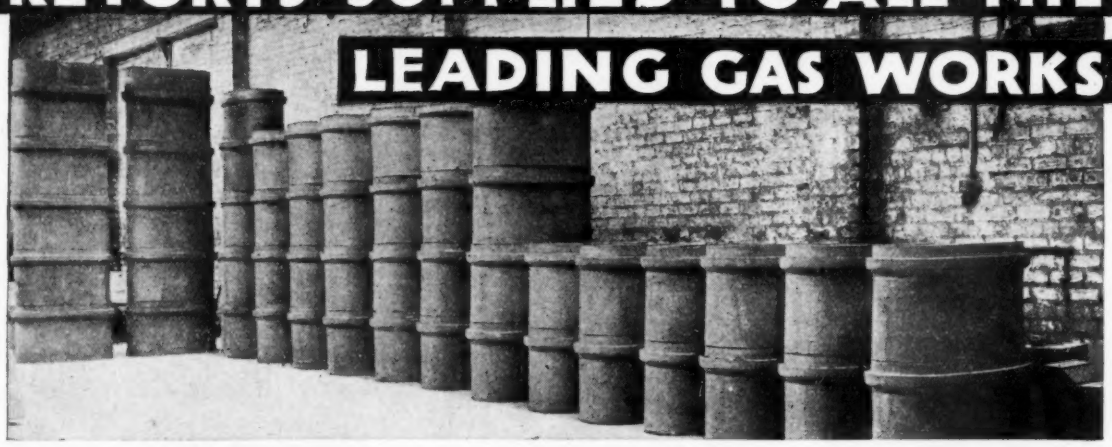

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"Have found none superior." . . . . "Cannot be surpassed for durability." . . .

"Undoubtedly the best which have been used here." . . . . "By far the best." . . .

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**FOR ASSURED ECONOMY SPECIFY "GLENBOIG"**

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Prepare for next Winter **Now**

**INSTAL**

# THE MOORE GAS PLANT

Fuel costs **1¾d.** per Therm with
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## Most Economical Carbonizing Results

The Moore Generator is a **Coal** and
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***Yields all the usual Residuals***
***Internally Heated*** ***Mechanically Operated***
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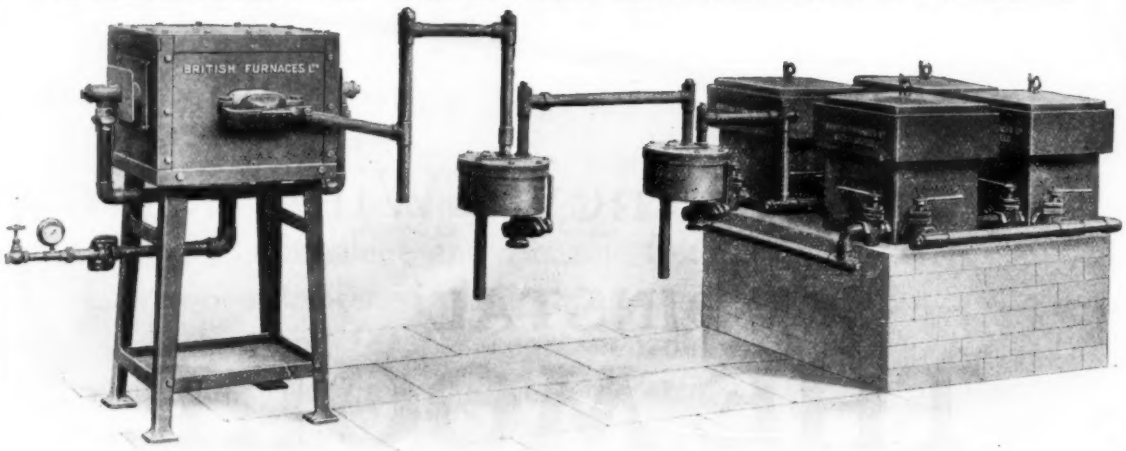
# ASSAY PLANT

FOR THE

EVALUATION OF COAL FOR CARBONISING PURPOSES

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WE SHALL BE PLEASED TO QUOTE FOR THE COMPLETE PLANT, INCLUDING WASHERS, PURIFIERS AND HOLDER, OR FOR THE FURNACE AND RETORT ONLY.

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**THORNABY-ON-TEES and STOCKTON-ON-TEES**

have foundries with an output of over 100,000 tons annually and are specially equipped for turning out

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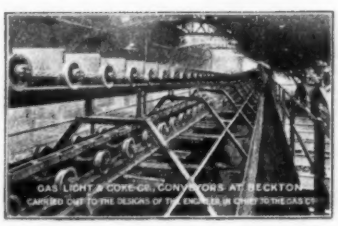

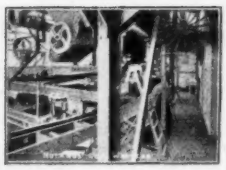

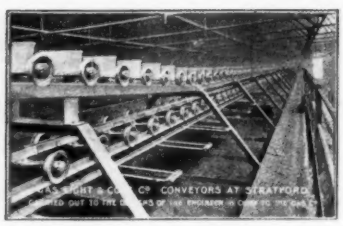

## GENERAL GAS PLANT

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**"HedWrit" Special Alloy Steels to suit all requirements.**

# *Why is*
# PORCELIRON
# *definitely superior?*

The finish of Cannon Cookers is known as "Porceliron," which has been a registered trade mark of the Company for 34 years.

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Our extensive practical knowledge of enamelling processes is unique for the following reasons—

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We actually enamelled Gas Cookers 50 years ago, and we have developed the process ever since.

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We were enamelling Cast Iron Hollow-ware long before most modern firms were in existence.

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"Porceliron" Sanitary Ware is another field of our enamelling activities.

* * *

In that hardest of all schools—the chemical industry—our "Porceliron" vitreous enamel occupies a position second to none.

* * *

So that when we enamel a modern gas cooker you have the benefit of all this accumulated experience.

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That is why the Gas Industry regards "Porceliron" as the finest of all enamel finishes.

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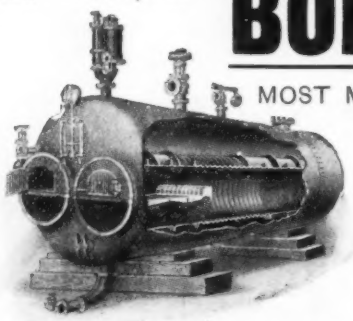
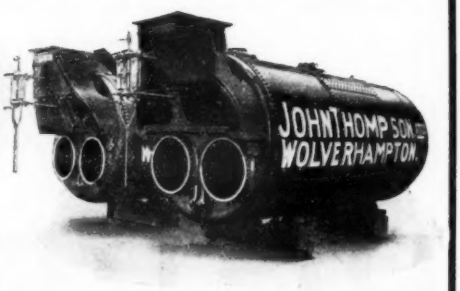
# CANNON COOKERS

NEW "Thompson"

# BOILERS EX STOCK



MOST MODERN "DISH-END" TYPE
WITH CORRUGATED SECTIONS
Standard Sizes in Stock
ALSO
WATER TUBE, CORNISH
AND VERTICAL BOILERS
SUPERHEATERS AND PIPEWORK

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"ECONOMIC"
BOILERS

JOHN THOMPSON (WOLVERHAMPTON) LTD.
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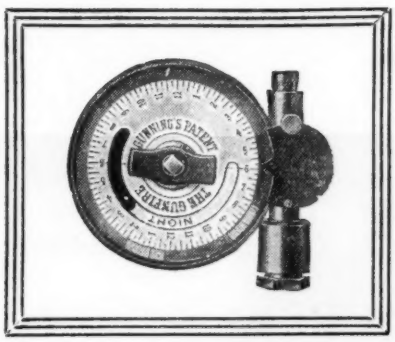
# "GUNFIRE"



THE CONTROLLER THAT HAS NEVER BEEN EQUALLED
For Efficiency, Quality, or Value. The same principle that we used in 1898
That has built up a reputation second to none by its merits alone

*There are more "GUNFIRES" in use than all other makes*
*Have "Gunfires" and no regrets*

BRITISH, FOREIGN & COLONIAL
*Automatic Light Controlling Co., Ltd.*
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# JOSEPH EVANS & SONS, (WOLVERHAMPTON) LTD.

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Please apply for Catalogue No. 8.

TRADE MARK.

Fig. 705 "SINGLE RAM" STEAM-PUMP.

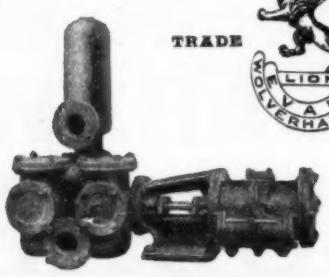


Fig. 598. "CORNISH" STEAM-PUMP FOR BOILER FEEDING, &c.

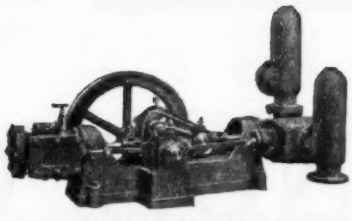


Fig. 685. "RELIABLE" STEAM PUMP FOR TAR AND THICK FLUIDS.

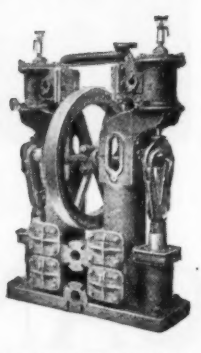


Fig. 712. "DOUBLE-RAM" STEAM-PUMP.

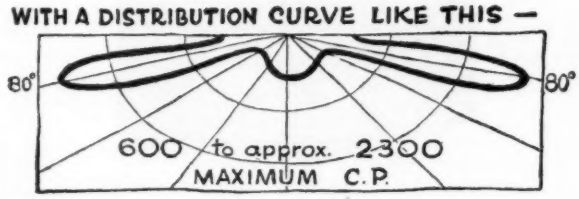
X A NEW TWO-WAY ASYMMETRICAL LIGHTING UNIT X

# THE KEMPAR STREET LAMP

FOR LOW PRESSURE GAS LIGHTING

REG. DES. 779715 AND PROV. PAT. 1938/33

WITH A DISTRIBUTION CURVE LIKE THIS —




The Lamp emits a little over 300 C.P. per Bijou Nozzle

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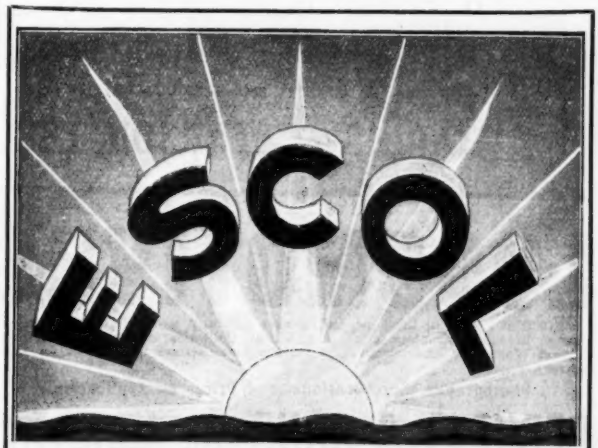


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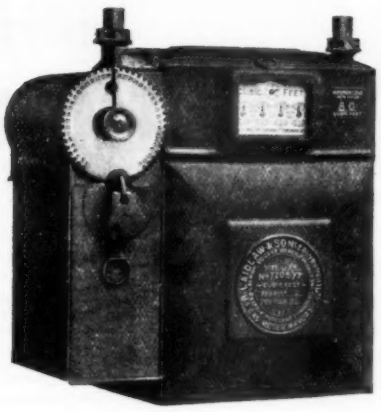

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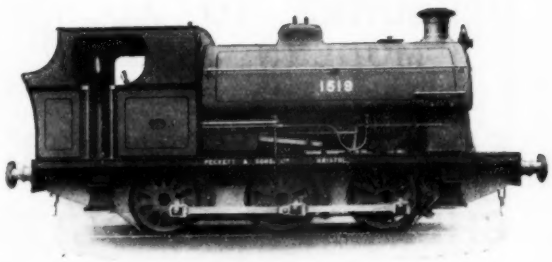


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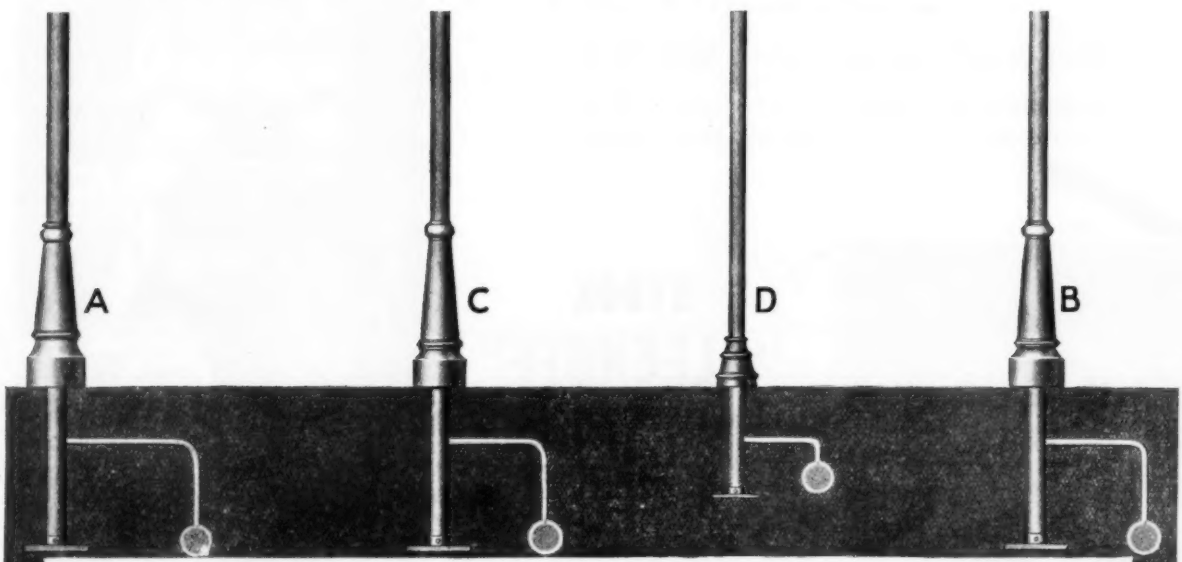


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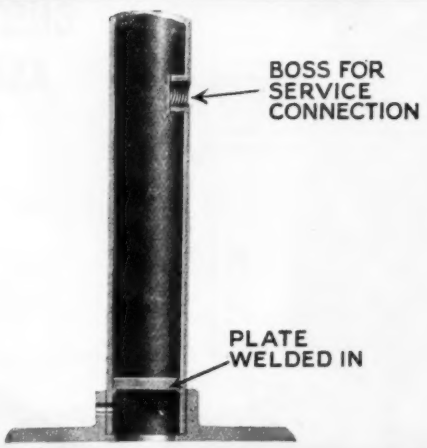


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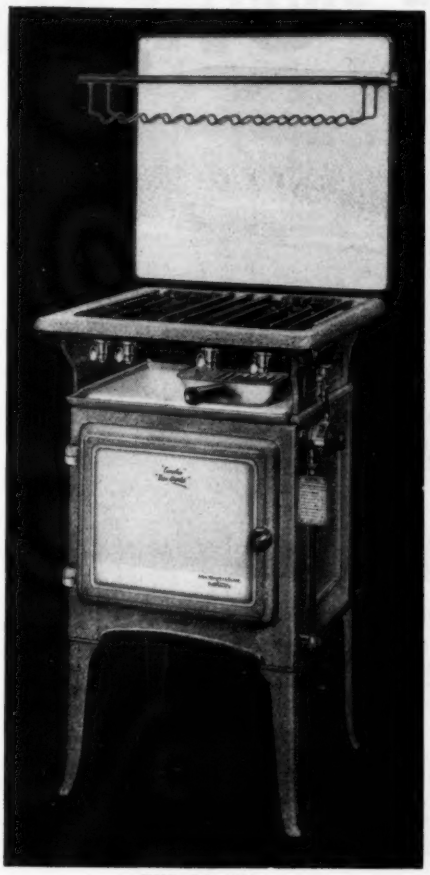

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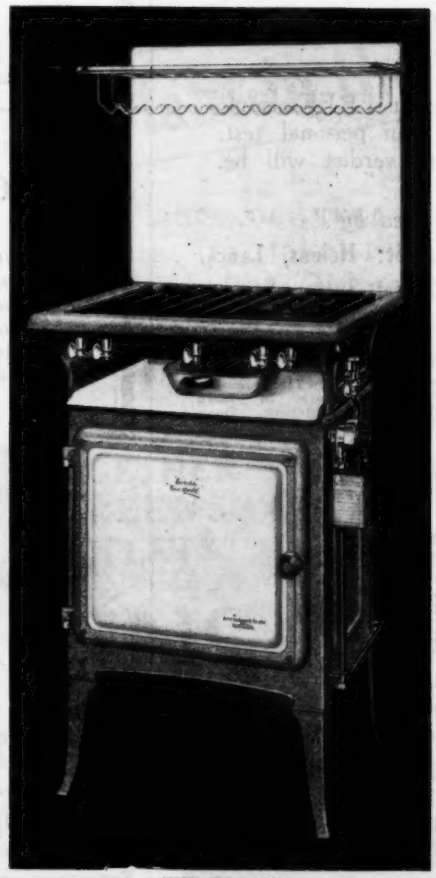

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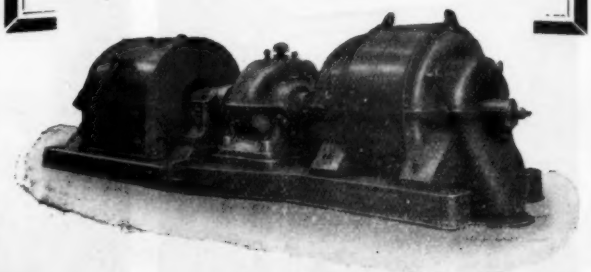

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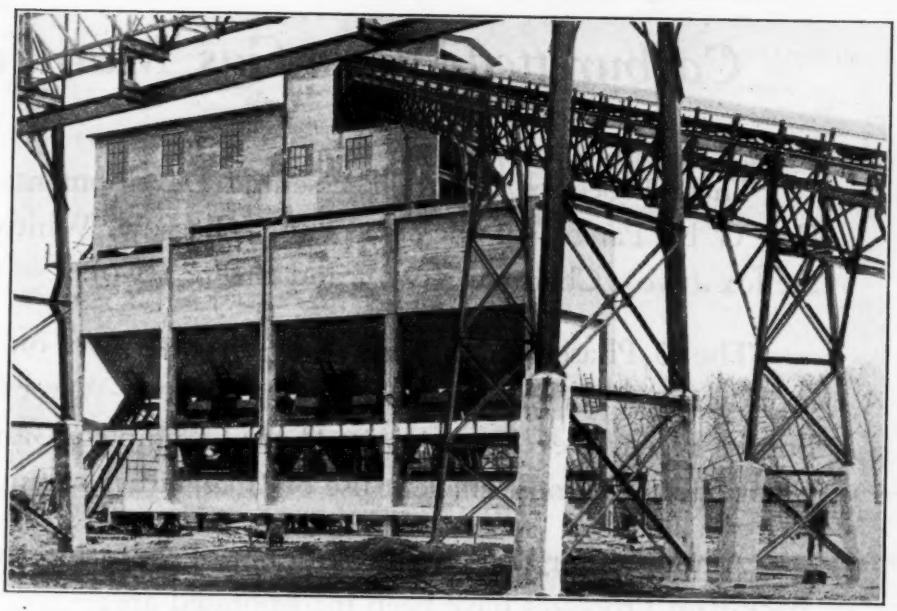

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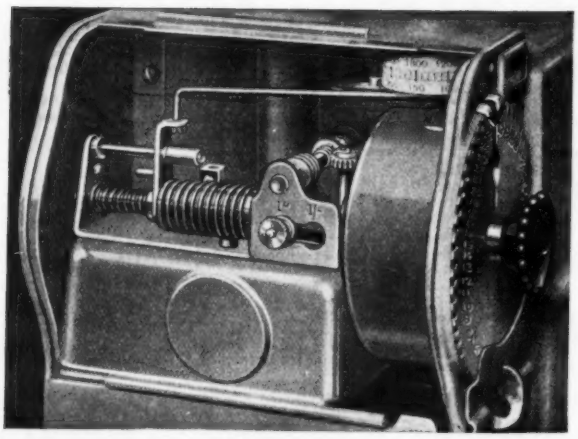

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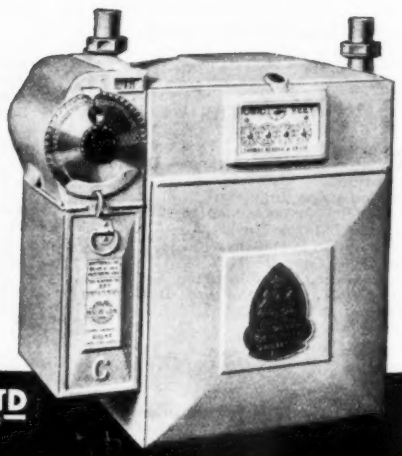

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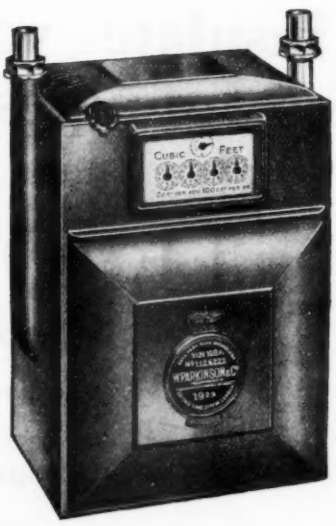

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# THE GAS JOURNAL

APRIL 5, 1933

Vol. 202. 85th Year No. 3646

## A Glance at the Contents—

**Assistant Secretary Required.**

A Gas Company in the West of England is inviting applications for the post of Assistant Secretary, the salary offered being £600 per annum. [p. 66.]

**Sales Manager Required.**

A Metropolitan Gas Company is inviting applications for the position of Sales Manager at a commencing salary of £400 per annum—age 35-40 years. [p. 66.]

**Mechanism of Coke Formation.**

A contribution by Dr. G. E. Foxwell, dealing with some of the recent ideas enunciated upon the subject of the mechanism of coke formation, is continued from last week's issue. [p. 41.]

**Town-Gas 'Bus in Daily Service.**

The gas-driven vehicle, which was demonstrated at the British Industries Fair at Castle Bromwich, is now in regular service on Birmingham routes, and details of the 'bus are given. [p. 37.]

**Distribution of Ash in Coal and Coke.**

Mr. A. Marsden, of Bristol, discusses the distribution of ash in coal and its effect on the coke resulting from carbonization, and he shows that total quantity of ash in a coal as ordinarily determined is no true criterion of the value of a coke burned either in the open firegrate or the closed hot water boiler. [p. 54.]

**S.B.G.I. Medals for Juniors.**

The Council of the Society of British Gas Industries has decided to award Silver Medals for the best papers to the Junior Gas Association, such papers to be read by members or associate members to their own Association. [p. 31.]

**Croydon Water Heating "Push."**

With a view to counteracting the local electrical undertaking's efforts to "push" their water heaters, the Croydon Gas Company staged a forceful display of instantaneous gas water heaters in conjunction with Messrs. New Geysers, Ltd. [p. 45.]

**Survey of the Gas Industry.**

The Presidential Address of Mr. J. H. Cornish to the Southern Association of Gas Engineers and Managers is a broad survey of the Industry by one who has had a lifelong experience of it, and there are several matters of interest on which his comments are useful. [p. 48.]

**Gas Light and Coke Company's Bill.**

The opening of the proceedings before the House of Commons Committee is reported in connection with the Gas Light and Coke Company's Bill, the principal object of which is to prevent housing authorities within the Company's area of supply imposing conditions upon their tenants concerning the form of light, heat, power, or energy they may use. [p. 42.]

## Forthcoming Engagements

**April 7.**—NORTH BRITISH ASSOCIATION OF GAS MANAGERS.—Spring Meeting in Glasgow.
**April 7.**—Annual Meeting of Gas Salesmen in London.
**April 10.**—I.G.E.—Finance Sub-Committee, 2 p.m.; Finance Committee, 2.30 p.m.; Executive Committee of the Council, 3 p.m.; Benevolent Fund Committee of Management, 4.30 p.m.
**April 11.**—N.G.C.—Meeting of Central Executive Board.
**April 11.**—I.G.E.—Council, 10 a.m.; Gas Education Committee, 4 p.m.
**April 11.**—FEDERATION OF GAS EMPLOYERS.—Meeting of Central Committee.
**April 11.**—I.G.E.—Meeting of Joint Research Committee of the Institution and Leeds University, 2 p.m.
**April 12.**—I.G.E.—General Research Committee, 2.30 p.m.
**April 12.**—I.G.E.—Meeting of Liquor Effluents and Ammonia Sub-Committee, 11 a.m.
**April 12.**—INSTITUTE OF FUEL.—Visit to Beckton Coke Ovens and Greenwich "Metro-Coalite" plants.
**April 27.**—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS (WESTERN SECTION).—Commercial Meeting at Exeter, 2.30 p.m. Subject for discussion, "A
**April 22.**—WALES AND MONMOUTHSHIRE JUNIOR ASSOCIATION.—General Meeting at Newport.
**April 22.**—YORKSHIRE JUNIOR ASSOCIATION.—Meeting at Sheffield. Paper by Mr. H. Wadsworth.
**April 25.**—I.G.E.—Gasholder Sub-Committee, 3 p.m.
**April 25.**—I.G.E.—Meeting of Gas Appliances Sub-Committee, 11 a.m.
**April 27.**—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS (EASTERN DISTRICT).—Meeting at 28, Grosvenor Gardens, S.W. 1, 2.30 p.m. Subject for discussion will be "Benzole Extraction, Technical and Commercial Aspects."
**May 4.** I.G.E.—Meeting of Joint Lighting Committee, 2.30 p.m.
**May 5.**—NORTH OF ENGLAND ASSOCIATION.—Annual Meeting, County Hotel, Newcastle, at 2 o'clock.
**May 10.**—N.G.C.—Annual Meeting, Hotel Metropole, London, 2.30 p.m.
**May 10.**—FEDERATION OF GAS EMPLOYERS.—Annual Meeting, Hotel Metropole, London, 3.15 p.m.
**May 11.**—SOCIETY OF BRITISH GAS INDUSTRIES.—Annual General Meeting and Dinner, Hotel Metropole, London.
**May 11-12.**—EASTERN COUNTIES ASSOCIATION.—Spring General Meeting at Croydon.
**May 17.**—B.C.G.A.—Meetings of Executive Committee, 11 a.m.; General Committee, 2.30 p.m., 28, Grosvenor Gardens, S.W. 1.
**May 18.**—WALES AND MONMOUTHSHIRE ASSOCIATION.—Meeting at Abertillery.
**May 19.**—SOUTHERN ASSOCIATION.—Meeting at Bridgwater.
**May 25.**—MIDLAND ASSOCIATION. — Spring meeting at Stafford.

# EDITORIAL NOTES

## *Preparing Good Coke*

THE meeting of the Western Junior Gas Association on March 11 was to have been devoted to presentation and discussion of four short papers. This plan, however, was unable to be carried out, and at short notice Mr. A. Marsden, of the Bristol Gas Company, was asked to step into the breach and address the members. He had only a week to prepare his notes, but this handicap did not prevent him from contributing a paper which will be of value to all in the Gas Industry who are concerned with the manufacture of a coke which will sell readily and bring satisfaction to the consumer. He confines his attention to the distribution of ash in coal and its effect on the coke resulting from carbonization, and he shows that total quantity of ash in a coal as ordinarily determined is no true criterion of the value of a coke burned either in the open firegrate or the closed hot water boiler.

For long we have emphasized how necessary it is that we should carbonize cleaned coals—how expense entailed in the cleaning process is amply repaid not only in increased capacity of gas-making plant but also in a more saleable coke. That this cleaning should take place at the pit-head is, we think, now generally recognized; and it is good to note what progress has been made in this direction during the past few years. Mr. Marsden discusses cleaning processes in an original light. He points out that either washing or dry cleaning reduces the percentage of ash in coal by eliminating free impurities such as shale, slate, and pyrites. It is difficult, however, entirely to eliminate shale, and one sometimes finds the ash in a cleaned coal higher than one would expect, though the cleaning plant may be operating satisfactorily. This may be due to the nature and distribution of the extraneous ash. The author takes two coals to exemplify his point. Before cleaning, one coal, which we will call "A," contains 15·6% of ash, and after cleaning (wet process) 10%. The other coal ("B") has before cleaning 11·6% of ash, and 10% after being treated. This coal is picked and screened; the small coal is cleaned and then mixed with the large. As will be noted, the ash reduction is small, and this is due to the presence of bands of stone and shale which run through the pieces of large coal. It is a matter of distribution, therefore; and in actual practice, though these two coals are cleaned to the same final figure of ash content—10%—the coke from coal "B" gives vastly inferior results due to the presence of a large amount of "bats."

From certain points of view, then, the ash percentage in a coal may be misleading, or at any rate fail to give a complete picture of the possibilities involved. "It would appear," says Mr. Marsden, "that in the past, when considering the quality of coke which could be made by high-temperature carbonization from a given coal, great stress has been laid on the 'ash content' of the coal . . . but relatively little attention seems to have been paid to the ash distribution in the coal. It is quite possible to have a coal with a high ash percentage (say, 12%) which will produce a coke capable of giving better service in domestic appliances such as slow combustion stoves or even open grates, than another coal containing only half as much ash, or even less. In the first case the ash would be mostly of the inherent type or at any rate distributed fairly uniformly throughout the coal, while in the second much of the ash would be present as lenticles or laminæ, thus producing a much larger quantity of 'bats.'" Ash percentage in a coal, then, is no guide to the amount of "bats" the coke from it will yield.

For this reason Mr. Marsden evolved a simple and rapid method, which he describes in his paper, of arriving at the way in which the ash is distributed in coals. He developed a "bat" detector. This consists of a small brazier in which a definite weight of coal—usually 20 lbs. with nut coal—is burned, and the resultant "bats" or stone weighed and returned as a percentage on the coal as received. The time for a test, avoiding clinkering conditions, is about six hours. One of the graphs which illustrate his paper depicts the results from a number of different coals, and it is shown how a certain coal is a great offender. The coke made from this particular coal gives poor results in both the slow combustion stove and the open grate—a fact which would not be disclosed by the ordinary test for ash. Though we single out this piece of work as being of particular interest, Mr. Marsden's whole paper is, within its compass, an admirable study of the ash-in-coal problem and its relation to the future market for coke. It is, in fact, a thoroughly worth-while contribution to our Industry's technical literature.

## *Survey of the Industry*

"WE are meeting at a time when the depression in our industries is still very near to its lowest point, and we may congratulate ourselves that the Gas Industry has come through the trial without any substantial loss. . . . Are we fully prepared to meet the increased demands with which we shall certainly be faced as soon as industry reaches that real revival which all so ardently desire? Extensions of manufacturing plant and of mains should certainly be undertaken by anyone who has any shortage or deficiency in any department. Prices are very favourable, and in the interests of labour and from patriotic motives such extensions are eminently desirable." This quotation is from the Presidential Address of Mr. J. H. Cornish to the Southern Association of Gas Engineers and Managers, delivered on Friday last and published in our issue to-day. Signs are not wanting of increasing confidence in the recovery of prosperity in Great Britain. That the recovery will be gradual is evident; it is equally evident that anything we can do to help this recovery is in the national interest. Ultimately, too, present carefully-planned expenditure on gas manufacturing and distribution plant will benefit the Industry, for there is no reason to believe that gas sales are going to show a slump. And it has to be remembered that our competitors are by no means idle.

The address of Mr. Cornish is a broad survey of the Industry by one who has had a life-long experience of it, and there are several matters of interest on which his comments are useful. He speaks of the very definite bias of municipal authorities towards electricity, and in this connection our readers should not miss the speech of Mr. Tyldesley Jones, K.C., in opening the case for the Gas Light and Coke Company Bill, which is before a Committee of the House of Commons. This speech, in which several significant incidents of competition in the Company's area are related, will be found on later pages of this "JOURNAL." We agree with Mr. Cornish that unless we are up-to-date in our methods and organization our business will be threatened, but we do think that most in the Gas Industry are alive to the facts and are endeavouring successfully to overcome obstacles. Systems of charge, for example, are being inaugurated in many parts of the country which should have a highly beneficial effect on gas sales, and for the most part the facilities afforded the consumer by way of easy hire or hire-purchase of appliances are in keeping with the general business practice of to-day. Suggestions are put forward by Mr. Cornish which aim at increased customer satisfaction, and among these is the distribution of gas of more uniform calorific value. He does not advocate one standard for the country, but he

queries why it should not be practicable to restrict the number of calorific values declared. Where, he asks, lies the justification for divergence over such close limits as 480 and 475 B.Th.U.? Why not limit ourselves to such round figures as 500, 475, and 450 B.Th.U.? Our opinion is that the divergence of the calorific value declarations will tend to become less in time. Certainly this has been a marked tendency during recent years, as was shown by Mr. W. J. A. Butterfield in his paper at the Joint Gas Conference at the British Industries Fair in 1932. Moreover, if town gas is to develop as a fuel for long-distance motor transport, as distinct from motor passenger services the routes of which are within a small area, this tendency towards a uniform calorific value will be accentuated.

## Catering for the Coke Market

THEN, for more efficient service, apart from constancy of calorific value, greater attention will have to be paid to the maintenance of uniform specific gravity. As to the question of adequate and uniform pressure, we think that far more extended application of governors, either at the appliances themselves or at the service, will mark future gas practice—in both domestic and industrial fields, though no doubt governors on industrial appliances will be the first consideration. The idea of installing a governor at every premises or even at every set of premises does not, however, appeal to Mr. Cornish. Yet, unless uniform and adequate pressure is ensured, how is the consumer to obtain the best results from his appliances? Certainly adequacy alone will not bring satisfaction with gas lighting, which gives a visual and annoying demonstration of varying pressure. In regard to the manufacture of gas of uniform quality at small works, Mr. Cornish rightly emphasizes the advantages of modern continuous vertical retorts, which allow of such great flexibility.

We are particularly glad to note the importance which Mr. Cornish attaches to the proper preparation of coke for the market. No gas-works to-day should be without a coke screening plant; and there is no doubt that if the directing minds of smaller works realized the advantages of a good coke grading and handling plant they would have no hesitation in installing such plant. There is ample evidence of this in the address of Mr. Cornish. The coke he sells is readily absorbed in his own gas area; actually the demand is at present greater than the supply. The reason is that he has always encouraged the use of coke for domestic purposes, and, realizing that a coke of low ash content and graded to satisfy requirements is wanted, he selects coals of low ash content, and grades his coke. He has a rotary screen and breaker, and supplies three sizes of coke at a charge of 1d. per cwt. above the ordinary price of coke in the yard. Since the installation of this Cort machine, which Mr. Cornish states gives excellent results, fully 60% of his sales has been of the graded class. At the moment his chief customers use coke for firing domestic hot water boilers, which, of course, is an excellent field. But a field of far greater potentiality is the open fire grate—a fact which Mr. Cornish fully appreciates. Everything should be done to cultivate this outlet for coke—for the demand would increase in direct proportion to the increase in production.

## As a Matter of Fact

THE recent terrible disaster at the Neunkirchen Iron Works has, perhaps naturally, been followed by a good deal of comment in the Press—not all of it, quite obviously, of equal value. Two or three weeks ago, a writer in an electrical contemporary, after making reference to " the presence of all these waterless gasholders that disfigure the landscape," went on to say: " There have been a number of explosions in the past few years, due to ordinary gasholders at Manchester, Keighley, Rugby, Folkestone, Truro, and elsewhere." Chapter and verse are not given, but, in the interests of historical accuracy, we have referred to records in the " JOURNAL," &c., relating to the places named, and it may be well to reproduce here the results.

*Manchester.* (Information from the Home Office Inquiry.)
The accident occurred on Aug. 23, 1927. Two gasholders at the Bradford Road Gas-Works were involved. " It appears that gas escaped from one of the holders and took fire in the air; this involved the second holder, the gas from which also escaped and took fire. Both holders were wrecked, but otherwise the gas-works were undamaged. The causes of the escape of gas and its subsequent ignition are difficult to determine, but it may be said at once that, so far as is known, there was no explosive gas or mixture of gas and air in the holders prior to the accident, and no explosion inside either holder took place beyond possibly an explosion of a limited amount of gas remaining in the holder after the bulk had escaped and been fired in the open air. It is inaccurate, therefore, to describe the accident as due to an explosion."

*Keighley.* (" JOURNAL," Aug. 6, 1930.)
" Our photograph shows the results of an accident to one of the holders at the Keighley Gas-Works which happened on July 29 (1930) at about 8.10 a.m. There was a sudden roaring kind of noise, Mr. A. Bromley, Engineer and Manager, informs us, and some of the workmen looked out and saw the holder ablaze on the roof and slowly lowering. The foreman in charge went at once to the valve house and shut the inlet valve; the outlet valve was already closed. The holder then settled into the tank. It was all over in about five minutes. There was about 750,000 c.ft. of gas in the holder at the time. The cause of the accident has not yet been ascertained, but there is no doubt that something gave way in the crown, and created a spark, thereby lighting the gas. No one was injured; and the only other damage done was a pane of glass broken at the back of the office which is about fifteen yards away."

*Folkestone.* (" JOURNAL," Oct. 6, 1926.)
" Repairs were being carried out to one of the seams of a gasholder of the Folkestone Gas and Coke Company by electric welding, when, owing to an escape, the gas became ignited. There was little gas in the holder at the time, but to avoid any possibility of danger, the Fire Brigade were called to assist by keeping the plates cool; and in the course of something under an hour the trouble was under control. The damage to the holder and loss of gas did not exceed £50."

*Truro.* (" JOURNAL," Oct. 19, 1927.)
This accident involved the destruction of a cable-guided gasholder of 135,000 c.ft. capacity, and two cottages. " It was thought the original explosion occurred in one of the cottages about 50 ft. from the holder. The shock of this explosion may have caused the holder to tip and discharge its gas from under the bottom ring and around the cup. Charred fragments of the woodwork of the house were blown against the holder, and probably ignited the escaping gas."

*Rugby.*
So far as recollection serves, this explosion took place in September, 1925. The holder concerned was a small hydrogen holder at a local works. The holder was to be demolished, and apparently work was started before it had been entirely cleared of gas.

Reference is also made by our contemporary to the disaster in 1927 to the Pittsburg natural gas holder (of the ordinary type), which resulted in the loss of a number of lives; but there is no mention of the catastrophe which last autumn overtook the power station of the City of Brussels, and which, though fortunately involving neither loss of life nor serious personal injury, resulted in " the utter and complete wreckage of a fine engine room, almost in a matter of minutes."

## S.B.G.I. Medals for Juniors

IT will be recalled that some three years ago the announcement was made that the Society of British Gas Industries had offered a Gold Medal to be awarded annually for the best paper of a technical character by any member of the British Commercial Gas Salesmen's Circles, but at the last autumn meeting of the Society it was stated that for the second year in succession they had been unable to award this medal. In the report presented on that occasion by Mr. E. J. Fox, as Chair-

man of the Council, regret was expressed that " none of the younger generation connected with the gas undertakings of the country had shown sufficient initiative to compete for the Gold Medal awarded by the Society by presenting technical papers." A suggestion was then thrown out by Mr. R. J. Milbourne that the Council should take into consideration whether the rules governing the award could not be altered.

The matter having been discussed by the Society, it was unanimously agreed at a meeting of the Council in January that, instead of awarding one Gold Medal for the best paper contributed by the Gas Salesmen's Circles, Silver Medals be given for the best papers to the following Junior Gas Associations: Yorkshire Junior Gas Association, Manchester and District Junior Gas Association, Scottish Junior Gas Association (Eastern District), Scottish Junior Gas Association (Western District), Wales and Monmouthshire Junior Gas Association, Western Junior Gas Association, Midland Junior Gas Association, and London and Southern District Junior Gas Association. A Committee was appointed to draw up rules and regulations.

On another page of this issue of the " JOURNAL " the full conditions of the award are reproduced, and we feel sure that the members and associate members of the various Junior Gas Associations will appreciate the encouragement that is being thus held out to them by the Society.

# PERSONAL

### FORTHCOMING RETIREMENT OF MR. GRACIE.

Mr. H. H. Gracie, M.Inst.Gas E., Engineer and Manager of the Edinburgh Corporation Gas Undertaking, has intimated to the Corporation his desire to exercise his option of retiring within the next six months or so. This information has come as a great surprise to many of his friends, but we learn that it is not his intention to sever his connection with the Industry, but that he will, after an extended holiday, take up consultative and advisory work. Mr. Gracie has been over 43 years with the Gas Undertaking, and during the last 12 years has been in full charge as the Chief Engineer and Manager. Under his able direction the concern has made very rapid progress and is now in a most flourishing condition. The history of the Department during the past 12 years has been almost phenomenal, and nothing seems to have been left undone which could add to its success. Under his guidance the Department, as far as efficiency of plant and service are concerned, has been kept abreast of modern improvements and demands, and much important research and investigation work has been carried through with benefit to the consumer and the Industry.

A review of the results during the past 12 years reveals that some £500,000 has been spent in new plant, reconstruction, and modernizing the works, which are now equipped with the most up-to-date machinery and plant for easy and economic working. The finances have also been carefully conserved, for notwithstanding this large expenditure the outstanding capital debt is actually lower now than 12 years ago. At the end of each year there has been a substantial surplus.

The output of gas has been increased by about 1000 million c.ft., the price has been reduced from 5s. 8d. to 2s. 9d. per 1000 c.ft., which with other concessions brings it in line with pre-war rates. This represents on the present output a saving of over £450,000 to the consumer yearly.

It is interesting to recall that on Mr. Gracie's appointment as Chief he was required to take over the duties not only of Engineer and Manager but also of the Consultant.

Sir FRANCIS GOODENOUGH has consented to accept the Presidency of the National Association of Trade Protection Societies in succession to Lord Meston, who is retiring after serving in this capacity for three years.

* * *

Col. ROBERT SUMMERSIDE WILLIAMSON (74), of Rawnsley, Staffs, a Director of C. & W. Walker, Midland Iron Works, Florence Coal and Iron Company, Shelton Iron Steel and Coal Company, Vice-Chairman of the Cannock Chase Coal Owners' Association, a Director of Cannock and Rugeley Colliery Company and of William Harrison, Ltd., left £128,833 (net £127,078).

* * *

Mr. J. B. CLAY who has for some years represented Alder & Mackay, Ltd., in the Midlands and North of England, has now been appointed Assistant Sales Manager in that area. Mr. ANDREW BLACKHALL from the Company's London Office has been appointed a representative in the Manchester area. Mr. DOUGLAS RHODEN continues to act as the Company's representative in the Bradford area.

* * *

On March 31, Mr. HARRY S. WHILE, London Representative, of Messrs. Clayton, Son, & Co., Ltd., 5, Victoria Street, Westminster, retired. Mr. While has been associated with the Company for the past 47 years, first in conjunction with his father (the late Mr. Samuel While), and then as sole Representative, to the present time of retirement. During his long term of office Mr. While has come in touch with most of the leading gas engineers and officials operating in London and the South of England, and has arranged some of the most important contracts in structural gas engineering carried out during that period in his district, and also for the Colonies and Foreign Countries. He retires with the best wishes of all the numerous friends he has made, and with the high appreciation of his old firm, whom he has so worthily represented. Clayton's London Office will continue at 5, Victoria Street, and communications will be dealt with from that address.

# Correspondence

## *Coal v. Oil.*

SIR,—I noticed in an Editorial in last week's " JOURNAL " (March 29) that reference was made to an article which appeared in the " Western Mail and South Wales News " on " Problems of Producing Oil from Coal," by Mr. W. T. Lane.

As a late employee of the Cardiff Gas Light and Coke Company and at present in the employ of the Darlington Corporation Gas Department I would like it made known that I am in no way connected with the writer of that article.

Yours, &c.,
W. T. LANE.

*Ravensdale Road,*
*Darlington,*
*April 3, 1933.*

## Whitsun Cruise to Spain and Portugal.

A splendid opportunity for members of the Institution of Gas Engineers to make one of those short cruises in luxury liners which have become so tremendously popular is afforded by the departure of the Cunard Liner " Lancastria " from Liverpool on June 3 for a seven days' trip to Corunna (Spain) and Oporto (Portugal).

This sailing date coincides with the end of the 70th Annual General Meeting of the Institution to be held at Liverpool from May 30 to June 2, and the Secretary has reserved accommodation in the " Lancastria " for 200 members and others attending the meeting.

Skilfully planned for comfort in any climate, and with a completely up-to-date system of ventilation, the " Lancastria " combines all the essential qualities of a cruise liner. At present the ship is undergoing an extensive overhaul, during which many new cruise features are being installed before she opens her cruise programme at Easter. Among these alterations are the installation of a new garden lounge, a new cocktail bar, and a sun-bathing platform which, with the adjoining open-air swimming pools, will form a delightful " Lido " at sea.

In addition the entire accommodation in the ship is of course being overhauled, spring-cleaned, and in many instances re-decorated.

There will be one class only carried on the cruise, the rates for which vary from 9 guineas. The reservation for members of the Institution holds good until April 7, and anyone interested should apply as soon as possible to the Cunard Company Cruise Department, Liverpool, or to the Cunard Company, 28, Cockspur Street, London, S.W.

Letters of inquiry should be endorsed " The Institution of Gas Engineers," and if received before April 7 they will receive preferential allocations. After this date, however, the Institution will not have any accommodation reserved.

# THE NEWS OF THE WEEK

**The Annual Dinner** of the staff and employees of the Wellington (Salop.) Gas Company took place at the Forest Glen Pavilion on Saturday last, and proved to be one of the most enjoyable functions of its kind.

**Gas Undertaking Relieves Rates.**—The St. Helens Gas Committee have decided that the sum of £1600 be contributed out of the profits of the Gas Undertaking for the year 1932 to 1933 in aid of next year's rates.

**The Prescot and District Gas Company**, which was formed in 1833, celebrated its centenary by a luncheon on Tuesday, March 28. At the Annual Meeting of the Company it was stated there had been an increase in the sales of gas, and also in the number of consumers.

**Cheaper Gas for Power Purposes** has been approved by the Spenborough Gas Department. The reduction will take effect on gas used in excess of 2250 therms per month, from 6·75d. per therm to 5d. per therm, subject to the existing discount. The change applies as from April 1 and is subject to reconsideration at the end of twelve months.

**An Enjoyable Dance** was held on Friday last by the Sports Club organization of the Parkinson Stove Company, Ltd., at the Masque Ballroom, Birmingham. The proceedings, which were attended by Mr. R. J. Rogers, the Managing Director, attracted an attendance of over 400, various competition prizes being presented by Mrs. Rogers at the conclusion of a highly successful evening.

**An Illuminated Address** has been presented by Alderman J. H. Lloyd (Chairman of the Birmingham Gas Committee) to Mr. James Cheshire, who has retired after over 33 years with the Department. The address expressed the Committee's appreciation of his services. During the whole of the period Mr. Cheshire was engaged on various duties in the retort house at the Adderley Street Works.

**World Power Conference, Sectional Meeting.**—The Opening Reception takes place in Copenhagen on Monday, June 26, 1933, at one o'clock; the Official Opening is in Stockholm on Wednesday, June 28, at noon. All the Technical Sessions will be held in Stockholm. The Norwegian part of the programme begins on Friday, July 7, and the final proceedings in connection with the Conference will take place in Oslo on Saturday, July 8.

**Aids to Beauty.**—It is learned from "Gasatack," the organ of the Sales Department of the Consumers' Gas Company of Toronto, that the Canadian Government Bureau of Statistics reports the volume of production of toilet preparations well maintained. In view of the fact that the industry makes considerable use of gas-fired steam boilers for face cream manufacture, this is indeed satisfactory. The oils used in face-creams must be carefully treated, and the steam-jacketed kettle is the approved appliance for the purpose. There are 34 Ontario factories engaged in this and similar work.

## South-Eastern Gas Corporation.

### Details of Acquisitions.

Complete particulars are now available of the properties acquired by South-Eastern Gas Corporation, Ltd., which was formed in December, 1932, under the auspices of Dawnay, Day, & Co., and Edward de Stein & Co., for the purpose of consolidating a number of important South of England gas undertakings.

The Corporation, which has a capital of £1,000,000, has purchased:

93% of the issued capital of the Folkestone Gas and Coke Company
97% of the issued capital of the Whitstable Gas and Coke Company, Ltd.
62% of the issued ordinary capital of the Deal and Walmer Gas Company.
71% of the issued capital of the East Kent Gas Company, Ltd.
93% of the issued capital of the Maidstone Gas Company
84% of the issued capital of the Dover Gas Company, and
£25,000 6% debentures (the whole balance which will remain outstanding of the issue) of the East Kent Gas Company, Ltd.

The total price paid for these holdings, it is now announced, amounts to £1,013,453. Estimated revenue from its investment, based on the dividends declared by the controlled companies for the past three years, is £54,684 per annum, giving a yield of 6·4% on the Corporation's £500,000 issued ordinary share capital, after dividend requirements on its redeemable 4½% cumulative preference shares, of which 500,000 are authorized and issued.

The areas served by the controlled companies cover approximately 360 square miles, and are all contiguous except for a few miles separating the area of the Maidstone Gas Company from that of the East Kent Gas Company.

## Institution of Gas Engineers.

Members of the Institution are invited to attend the meeting of the Illuminating Engineering Society, at the Institution of Mechanical Engineers, Storey's Gate, St. James' Park, S.W. 1, at 7 p.m. on Tuesday, April 11, when a discussion on "Hospital Lighting" will be opened by an introductory paper by Mr. F. Charles Raphael (Consulting Electrical Engineer to St. Bartholomew's Hospital).

Light refreshments will be provided at 6.30 p.m.

Tickets of admission may be obtained from the Secretary, Institution of Gas Engineers, 28, Grosvenor Gardens, S.W. 1.

## Society of British Gas Industries.

### Conditions of Award of Silver Medals.

The Society of British Gas Industries has decided to award Medals for the best paper presented each year from the Members and Associate Members of each of the following Associations:

London and Southern District Junior Association.
Midland Junior Gas Association.
Yorkshire Junior Gas Association.
Manchester and District Junior Gas Association.
Wales and Monmouthshire Junior Gas Association.
Western Junior Gas Association.
Scottish Junior Gas Association (Eastern District).
Scottish Junior Gas Association (Western District).

The papers shall deal with:

(*a*) The design, construction or operation of plant for the manufacture, storage, or distribution of town gas.

(*b*) The design or the function of apparatus which shall entail the use of gas in its application domestically or industrially.

Each Medal shall be awarded for a paper accepted for presentation to and read at a General Meeting of a Junior Gas Association in the calendar year preceding the year of the award. A Presidential Address is not eligible for the award, and the author must be a member or an associate member of the Junior Gas Association before which the paper is read.

The Medals will be awarded annually in the month of May, and be presented each year to the recipient at the Annual Meeting and Dinner of the Society of British Gas Industries, or, failing this, at the Annual Meeting of the Junior Gas Association concerned.

Five copies of each paper submitted for competition should be forwarded to the Secretary of the Society of British Gas Industries, 56, Victoria Street, London, S.W. 1, not later than Feb. 28 in any year.

The Council of the Society shall be responsible for adjudication.

In making the award, consideration will be given to:

(*a*) The method of presentation.
(*b*) Originality.
(*c*) Evidence of technical understanding.
(*d*) Its relevance to current problems.

The Medals will not be awarded if, in the opinion of the Council, the papers submitted do not reach a sufficient standard of merit.

## *THE NEWS—continued.*

### Gas Exhibition at Manchester.

The Manchester Corporation Gas Department have a bright and attractive show of gas appliances in the Brighter Homes Exhibition now being held in the City Hall, Deansgate. The Exhibiton will remain open until April 9.

Modern gas cookers in pleasing mottled and blue and white finishes are the principal features of the exhibits, and there are also a number of charmingly coloured gas fires in various styles to harmonize with almost any scheme of decoration. Special attention is also directed to the "Panella" gas fire, gas heating appliances, gas lighting fittings, portable heaters, and various subsidiary apparatus.

### National Gas Council.

The Fifteenth Annual Meetings of the National Gas Council and the Federation of Gas Employers will be held on Wednesday, May 10.

The arrangements provisionally made are as follows:

Meeting of the Central Committee of the Federation, Hotel Metropole, 11 a.m.

Meeting of the Central Executive Board of the Council, Hotel Metropole, 11.30 a.m.

Luncheon, Hotel Metropole, 1 p.m.

15th Annual Meeting of the National Gas Council, Hotel Metropole, 2.30 p.m.

15th Annual Meeting of the Federation of Gas Employers, Hotel Metropole, 3.15 p.m.

### Central Heating at Southampton.

An interesting example of the recognition of the value of gas for central heating is shown by the recent placing of an order by the Southampton Harbour Board for the heating of the Pier Pavilion by gas.

The exposed position of the building, coupled with the fact that there is a constant flow of air underneath it, made the problem a complicated one in view of the importance attached to initial cost. The plant selected comprises two 2 G.B.6 "Ideal" gas-fired boilers with mo-pump accelerator, each supplying a direct radiating surface of 1500 sq. ft., and having an output of 225,000 B.Th.U. per hour.

The order was obtained in face of keen competition from other fuels.

### Evening Star Lodge, No. 1719.

#### Installation Meeting.

The Installation Meeting of the Evening Star Lodge, No. 1719, was held at Freemasons' Hall, Great Queen Street, on Wednesday, March 22, with W.Bro. T. F. C. Potterton in the chair, and was well attended by the brethren and their guests. After the usual routine business, the Report of the Standing Committee for the year 1931-32 was presented by the Treasurer, W.Bro. J. Fred. Wicks, P.M., and was unanimously adopted. It indicated that the Lodge is in a sound condition, substantial balances being reported on account of the General and of the Benevolent Funds.

The installation of Bro. W. H. Warren, S.W., as Master of the Lodge was then proceeded with, and the investiture of W.Bro. J. Fred. Wicks again as Treasurer was carried out. The other Officers appointed are as follows:

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| I.P.M. | W.Bro. T. F. C. Potterton |
| S.W. | Bro. W. F. Broadberry |
| J.W. | Bro G. D. Bidwell |
| Chaplain | W.Bro. J. A. Brentnall, P.M. |
| Secretary | W.Bro. Rae P. Normand, P.M. |
| D. of C. | W.Bro. A. B. Potterton, P.M. |
| S.D. | W.Bro. W. A. Scott, L.R. |
| J.D. | Bro. S. Hay |
| Organist | Bro. J. W. Swan |
| Assistant Secretary | Bro. E. J. K. Fussell |
| I.G. | Bro E. P. Stevenson |
| Stewards | W.Bro. R. W. Foster, L.R.<br>Bro H. J. Randall<br>Bro R. Kimber<br>Bro. J. C. Wright<br>Bro. S. B. Chandler |
| Tyler | W.Bro. R. H. Goddard |

A Past-Master's Jewel was presented to W.Bro. T. F. C. Potterton in recognition of his services to the Lodge during the past year.

The Lodge having been duly closed, the brethren proceeded to the adjoining Connaught Rooms for dinner. The customary Craft Toasts were observed at the conclusion of the repast, and an excellent musical programme was enjoyed.

### Co-Partnership Dinner at Sheffield.

The Fifth Annual Dinner of Co-Partners of the Sheffield Gas Company was held in Cockayne's Restaurant, Sheffield, on Thursday evening, March 30, there being over 300 members present.

Owing to the unavoidable absence of Mr. Ralph Halkett, General Manager and Secretary, the gathering was presided over by Mr. Ralph Halkett, Jnr., Assistant General Manager, who was supported by Mr. H. Chamberlain, Engineer, Alderman C. W. Gascoigne, Mr. W. Jackson, and members of the Committee.

### Physical Society.

At the Annual General Meeting of the Physical Society, held on March 17, the following Officers were elected:

*President.*—Prof. A. O. Rankine.
*Vice-President.*—Prof. W. Wilson.
*Secretaries.*—Dr. Allan Ferguson (Papers), Dr. Ezer Griffiths (Business).
*Foreign Secretary.*—Prof. O. W. Richardson.
*Treasurer.*—Mr. R. S. Whipple.
*Librarian.*—Dr. J. H. Brinkworth.
*New Members of Council.*—Prof. E. V. Appleton, Dr. L. F. Bates, Dr. L. Hartshorn.

### Cookers on Parade.

THE LONG AND SHORT OF IT
IS THAT "BAKERLOO" & "NEWHOME"
GAS COOKERS
ARE AS NEAR PERFECTION AS IT IS POSSIBLE FOR A COOKER TO BE
Come & See
BAKERLOO
& Newhome
GAS COOKERS

*The accompanying illustration shows the novel method adopted by Messrs. Falk, Stadelmann, & Co., Ltd., of 83-93, Farringdon Road, E.C. 1, to advertise their "Bakerloo" and "Newhome" gas cookers. The scheme is that wherever a demonstration of the firm's cookers is being carried out, Messrs. Falk, Stadelmann, & Co. are prepared to loan to the gas undertaking a model cooker, such as those illustrated above, which can be paraded round the streets.*

### Imported Fuel Oil.

In "The Times" for March 14 Mr. E. H. Davenport stated that "the bulk of the fuel oil imported for inland purposes is used in industrial processes where the use of coal is technically unsatisfactory or inadmissible." In reply to this Sir Francis Goodenough, while admitting that this may be true, points out that in the vast majority of industrial heating processes in which oil is used it can be satisfactorily replaced by a home-produced fuel—town gas. "As an instance I may cite the recent case of an important firm in the Midlands engaged in the manufacture of motor-bicycles and bicycles, where a change-over from imported oil to gas for japanning resulted in a notable reduction of

costs. Similar instances, showing that a conversion from imported oil to home-produced gas leads to increased efficiency of working and reduced costs, are to be found in numerous other trades.

"In 'the palatial hotels and offices' mentioned by Mr. Davenport gas-fired central heating plant is fully as efficient and cleanly as oil-fired plant, and has the advantages of needing no storage room for the fuel and no labour to handle it."

## S.C.I. Chemical Engineering Group.

The Annual Dinner of the Chemical Engineering Group of the Society of Chemical Industry will be held on Friday, April 28, at the Waldorf Hotel, London. The Rt. Hon. Lord Melchett is to be principal guest of the evening, and will deliver an address on "Modern Economics and Unemployment."

A few tickets (price 12s. 6d.) will be available to non-members in due course on application to the offices of the Group—Abbey House, Victoria Street, Westminster, S.W. 1.

## A Birmingham Merger.

The business of Thomas Piggott & Co., Ltd., has been controlled by the Horseley Bridge and Engineering Company, Ltd., for the past four years. It has now been decided to carry out a complete merger of the two concerns. Financial arrangements have been completed to give effect to this decision, and Thomas Piggott & Co., Ltd., is going into voluntary liquidation.

The whole of the assets of Piggotts will be taken over by the Horseley Company, and all liabilities will be dealt with by the liquidator in the ordinary course.

The business of Piggotts will be carried on exactly as heretofore. The same Board of Directors will be in control; there is to be no change in the Management, and the works will continue to manufacture all those products for which Piggotts have held a high reputation for more than a hundred years.

## Bookings for Film "Tar."

The following is the tenth list of bookings for the film of the British Road Tar Association. The showing will be for three days at each theatre:

April 13.—Cinema, Gretna.
May 1.—King's Hall, Walmer.
May 4.—Regal, Kinghorn.
May 8.—Palace, Freshwater.

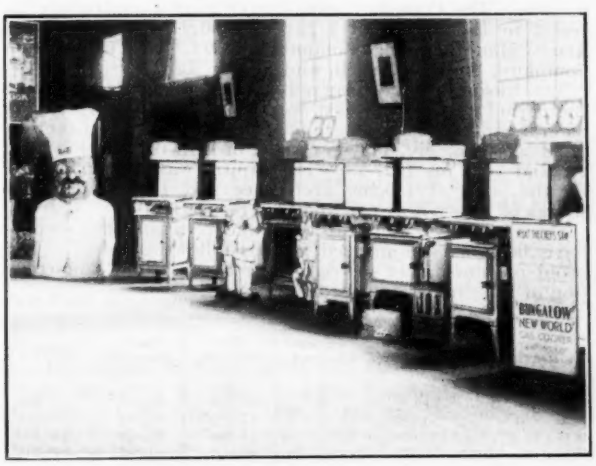
## Compressed Coal Gas Filling Station.

An important development concerning compressed coal gas as fuel is reported from Stoke-on-Trent. The Council is to be asked to approve the erection of a compressed coal gas fuel filling station.

It is stated that the Gas Committee proposes later to submit to 'bus operators in the Potteries a scheme whereby filling stations would be erected at convenient points in the city, to provide fuel for specially converted 'buses. Meanwhile the Committee may convert all its own vehicles and possibly all Corporation vehicles to run on compressed coal gas.—"Motor Transport," March 25.

# Gas Exhibition at Westgate

A successful Gas Exhibition has just concluded at Westgate, where the Gas Company arranged a series of practical cookery demonstrations which were held twice daily for four days. The display and lectures took place in St. Saviour's Hall, Westgate-on-Sea, and attracted considerable attention in the town. A special cake-baking competition proved extremely popular, and Miss E. Kirkby, M.R.S.T., M.C.A., the Radiation Lecturer, had no easy task in selecting the prize-winners. All the demonstrations were well attended, and much interest was evinced in the display of apparatus, which included Richmonds "Newlyn," "Lynton," "Equator," and "Don" water heaters, "Bungalow" "New World" cookers, "Marlborough" and "Yeoman" gas fires, &c. A similar exhibit was also staged at Birchington for four days, and proved equally successful. The Westgate and Birchington Gas Company show the right spirit of enterprise in going out after business in this progressive way. Sales have been gratifying, and the results of their effort are likely to be felt for a considerable time.



*THE NEWS—continued.*

## Hong Kong and China Gas Company, Ltd.

The quantity of gas sold in 1932 decreased by 5 million c.ft. at Hong Kong and increased by 1 million c.ft. at Kowloon. Machinery and plant at both works have been well maintained.

The average rate of Exchange during the year was 1s. 3$\frac{3}{4}$d. per dollar as compared with 1s. 0$\frac{3}{4}$d. per dollar, the average rate during year 1931.

Out of the balance of net revenue the Directors recommend the payment of a dividend at the rate of 10% per annum, free of income-tax, less 5% paid as an interim dividend on Oct. 15 last. (Meeting, April 13.)

## Coal Gas Manufacture in 1819.

No. 2 of the Second Series of calendar illustrations issued by Messrs. W. C. Holmes & Co., Ltd., is an excellent reproduction of a coloured drawing which appeared in Accum's "Process of Manufacturing Coal Gas," published in 1819.

This plant was installed when the present Royal Mint building was erected in 1810. It is interesting to record that coal gas was supplied to the Mint from an outside source—the Radcliffe Gas Company—in 1828, and that at the present time gas is used extensively for metal melting and various heat treatment processes. The yearly consumption now approaches 80 million c.ft.

Attached to the illustration are calendar slips covering the months of April, May, and June.

## Falk, Stadelmann, & Co.

Messrs. Falk, Stadelmann, & Co., manufacturers of incandescent mantles and burners, lamps, electrical appliances, wireless apparatus, &c., stated the "Financial Times" in a recent "Potential Investments" column, was registered at the beginning of 1887, converted into a private company in 1900, and re-converted into a public joint-stock undertaking in 1928. The Company owns (*inter alia*) a controlling interest in the Welsbach Light Company of Australasia, Arma Manufacturing Company, G.L. Eve Construction Company, Smith & Ansell, and Stoves, Ltd.

The business has prospered and expanded, and during the period between the last war year and re-incorporation several capital bonuses were paid in addition to satisfactory dividends—namely, 40% in respect of 1918-19, 40% for 1925-26, and 7$\frac{1}{2}$% for 1927-28. The capital was then increased by the issue of 450,000 preference and 112,500 ordinary shares of £1 each at par and 22s. respectively.

Since re-conversion into a public company the results have been as summarized in the following table. Net profit is shown after providing for depreciation, amortization of leaseholds, and income-tax:

| Year to March 31. | Net Profit. | Ordinary Dividend. | To Reserve. | Carry-Forward. | Stocks. |
|---|---|---|---|---|---|
| | £ | % | £ | £ | £ |
| 1929 . . . . | 82 874 | 7$\frac{1}{2}$ | 10,000 | 13,261 | 322,888 |
| 1930 . . . . | 99,177 | 7$\frac{1}{2}$ | 14,603* | 25,085 | 302,921 |
| 1931 . . . . | 83,050 | 7$\frac{1}{2}$ | 10,290* | 25,095 | 302,469 |
| 1932 . . . . | 91,177 | 5‡ | 10,000 | 17,272† | 298,899 |

* Written off goodwill and patents. † After transferring £2500 to staff funds ‡ *Plus* a capital bonus of 5%, free of tax, making the distribution equal to 11$\frac{1}{2}$% gross.

The profits of the subsidiary companies are included in the above figures to the extent of the dividends declared.

By virtue of a consistently conservative financial policy, the balance-sheet discloses an eminently sound structure in all essential respects.

## Gas in Villages.

In a letter to "The Times" of Friday last, Mr. W. N. N. Geary referred to the desirability of extending gas to all villages in Great Britain. He wrote as follows:

"Sir E. Hilton Young, in winding up the debate on unemployment, declared last week that water schemes for rural areas would be a useful field, and that he proposed to encourage county councils to contribute thereto. Excellent! And could his encouragement not also be extended to gas? It could be easily ascertained through district and parish councils how many villages and hamlets in Great Britain were without proper water supply and without gas. The extension of mains, water or gas, costs approximately £1 a yard, and water and gas companies usually require a guarantee of 5 to 10% on the capital outlay, and this can only rarely be obtained by concerted action of the householders. But district councils, urban and rural, have already statutory powers as to water to guarantee the interest on such outlay until the water rates thereby obtained implement the guarantee.

"The extension of water mains to every village offers a large field of work for the unemployed—unskilled labour for the digging of the mains and skilled for the plumbing, a demand for pipes—work which would be at all events partially remunerative, and would be permanently useful. When local authorities are sluggish the Government might apply pressure to constrain them to fulfil their functions. The Local Government Act of 1929 enabled county councils to contribute hereto, but the Kent County Council has passed a self-denying resolution that, as a general rule, it would decline to contribute.

"Similar arguments would apply to extending gas mains, though these would require legislation. And, why not? For humble households gas for heat, light, and, above all, cooking greatly alleviates woman's work in her home. In my village, 30 miles from London, the extension of gas mains would cost £2500. Here is work asking to be done; and why not set the idle hands thereto?"

# BOOK REVIEWS

### MUNICIPAL YEAR BOOK, 1933.

Every aspect of Local Government is surveyed in the fifteen hundred pages of the 1933 Edition of the Year Book, which gives a complete record of all the local authorities of Great Britain and Ireland and of the latest developments and legislation affecting them. The number of sections has been extended from twenty-five to thirty-seven, and they include the most up-to-date facts and figures regarding roads and transport, street lighting, housing, town planning, education, public assistance, public health, finance, and other branches of administration.

New features added this year include civil aviation, industrial development services, financial administration, British standard specifications, district valuers, and rating and valuation, while many of the former sections have been considerably extended. The information given is essential to all connected with municipal life.

The price of the book is 24s. 6d., or 25s. post free from The Municipal Year Book, 3 and 4, Clements Inn, London, W.C. 2.

### APPLIED CHEMISTRY IN 1932.

Doubtless a large number of our readers have on their bookshelves the Annual Reports of the Society of Chemical Industry on the Progress of Applied Chemistry, for these Reports form such an admirable digest of what happens each year in the development of fuel technology in general, and in the Gas Industry in particular.

Volume XVII., for 1932, maintains the high standard one has come to expect, and is characterized by the same care in preparation and the same wealth of references as marked the previous Reports. It enables one to obtain with comparative ease a broad idea of the progress made during last year and of likely future trends.

Four sections are of special interest to the Gas Industry. These are: "General, Plant, and Machinery," contributed by G. W. Himus; "Fuel," by Arthur Grouds; "Gas, Carbonization, Tar, and Tar Products," by J. Macleod and T. A. Wilson (Glasgow Corporation Chemical Works Department); and "Acids, Alkalis, and Salts," by A. Proven.

The price of the Report, which is obtainable from the Society of Chemical Industry, 46-47, Finsbury Square, London, E.C. 2, is to members 7s. 6d., and to others 12s. 6d.

# Parliamentary Intelligence.

[From Our Special Correspondents.]

## House of Commons.

### Private Bills.

The Gas Light and Coke Company Bill has been under consideration by Group "C" Committee during the past week. The Commercial Gas Bill is next on the list for the same Committee and will probably be taken next week.

### Special Order.

Plans have been deposited in connection with the Watford and St. Albans Gas (No. 2) Order.

MEMBERS OF THE SCOTTISH JUNIOR GAS ASSOCIATION (EASTERN DISTRICT) AT THE KELTY GAS-WORKS ON SATURDAY LAST.

# IN CONTINENTAL COUNTRIES - - -

*Abstract Translations from the Technical Press of France and Germany.*

### THE CAUSES OF THE THICKENING OF CREOSOTE (SOLVAY) WASH OIL.

J. A. Bordo and W. Mühlendyck describe, in "Brennstoff-Chemie," 1933, 14, 107-112 (Mar. 15), an investigation of the causes contributing to the thickening of creosote wash oil.

The effect of various individual gases ($H_2S$, $O_2$, $NH_3$, $CO_2$, HCN, CN, and $N_2$) was first studied at 20° C. In no case, save with oxygen, did thickening occur, and, indeed, the viscosity was reduced. With oxygen, an increase in viscosity occurred after the passage of large volumes of the gas. With impure carbon dioxide generated in a Kipp and containing hydrochloric acid gas, thickening occurred due to the polymerizing action of the hydrochloric acid, but this did not occur with pure carbon dioxide. In a similar manner, nitrogen containing as little as 0·25% by volume of hydrochloric acid gas gave rise to appreciable thickening in a short time.

Similar results were obtained when the individual gases were tested at 100° C., and thickening due to evaporation of oils was avoided by the use of a reflux condenser. A three-fold increase in viscosity was obtained with oxygen, and the content of asphalt increased from 0·4% to 5·0%. Mixtures of sulphuretted hydrogen and oxygen were found to be very effective in producing thickening of the wash oil, the sulphur formed from the oxidation of the sulphuretted hydrogen reacting with the constituents of the wash oil with formation of asphalt rich in combined sulphur. Sulphur readily thickens wash oil in the heat.

Ferrous chloride promotes, to a marked extent, the thickening action of mixtures of sulphuretted hydrogen and oxygen. This is of importance in coke oven technique, since, though the small amount of hydrochloric acid gas present in the gas would, by itself, be of no effect, it is liable to become converted into ferrous chloride by reaction with the metal of the plant. Iron present as oxide can also be effective. No organic compounds of iron have, so far, been detected in wash oil.

Water can give rise to stable emulsions with wash oil only when the latter has become considerably thickened due to asphalt formation, and these emulsions have a high viscosity. The absorptive power of the wash oil is reduced when emulsions are formed. Moreover, water has a corrosive action on the plant.

Tar present in the gas is a further cause of thickening, although only as a minor factor, since large quantities of tar can be added to the wash oil without causing a very great increase in the viscosity. Naphthalene does not cause thickening, but, on the contrary, reduces the viscosity of the oil. However, due to the solvent action of dissolved naphthalene on sulphur, high concentrations of naphthalene can promote the thickening action of sulphur. Thickening of wash oil has also been ascribed to the alternations of heating and cooling to which the oil is subjected. This is, however, of minor importance at temperatures below 150° C., though above 180° C. it becomes of more importance.

As is known, thickening is not confined to a particular fraction but to the whole of the wash oil. It has been stated that the alkali-soluble tar acids accelerate thickening, hence their behaviour was investigated. It was found that so far from accelerating the thickening of wash oil by the agency of crude coke oven gas, tar acids hinder thickening to such an extent that practical use might, with advantage, be made of their action.

Finally, semi-large scale tests with crude gas and with gas freed from sulphuretted hydrogen were carried out, and the marked reduction in the rate of thickening of the wash oil consequent on the absence of sulphuretted hydrogen was confirmed.

### THE TENDENCY OF TETRALIN TO AUTOXIDATION.

According to H. Hock and W. Susemihl, "Brennstoff-Chemie," 1933, 14, 106-7 (Mar. 15), tetralin may, by the action of air, be converted into tetralin peroxide, a crystalline compound with a melting point of 56° C., and having the constitution of α-tetralylhydroperoxide, $C_{10}H_{11}O \cdot OH$ (see also "Ber. d. Deutsch. chem. Gesell.," 1933, 66, 61, Jan.). At 130° C., the compound decomposes quickly and violently with deflagration and development of heat, though a blow does not cause it to decompose. In contact with finely divided metals, *e.g.*, zinc dust, the deflagration, which occurs at a lower temperature, may easily assume the character of an explosion. Tetralin containing peroxide can also show a tendency to decompose during distillation, the decomposition temperature being lowered in presence of alkali.

A qualitative test for the presence of the peroxide is the action obtained with iron pentacarbonyl. Gas is evolved, and a dark red colouration develops, due to precipitation of colloidal ferric oxide. The peroxide may be determined quantitatively by titrating the iodine liberated from potassium iodide in acetic acid solution. An approximate analysis is possible by noting the temperature rise obtained when solid sodium xanthate is added.

The autoxidation of tetralin may be prevented almost completely by addition of 0·1% of quinol under conditions in which, without this addition, concentrations of 15-20% of the peroxide could be formed. In practice, much smaller additions of inhibitor should suffice.

The peroxide, once formed, may be decomposed by aqueous solutions of ferrous salts which act catalytically and form α-keto tetrahydronaphthalene ($C_{10}H_{10}O$) and water.

# Scottish Junior Gas Association (Eastern District)

## Visit to the Royal Scottish Museum, Edinburgh

On the afternoon of Saturday, March 18, members of the Association visited the Royal Scottish Museum. The Technical Staff of the Technological Department conducted the party around an interesting display of aircraft models illustrating the earliest attempts in aircraft design to the latest Handley-Page forty-seater Trans-Continental liner.

The party proceeded to inspect the models in the Technological Department. Much interest was evinced in the working models of the diesel and other internal combustion engines.

At the conclusion of the visit Mr. DAVID WARDEN, President, returned thanks to the Museum Authorities for their services.

After the Museum visit the members adjourned to the Heriot-Watt College, where they were met by Mr. H. S. Hadley, of the Bromford Tube Company, Ltd., Birmingham. After a few introductory remarks Mr. Hadley exhibited a film on the manufacture of weldless steel gas mains, followed later by a further film taken at the British Industries Fair this year illustrating the uses of gas for traction purposes. Both films were received enthusiastically and an interesting discussion followed.

### Discussion.

Mr. J. RICHMOND (Penicuik) asked if a new mandril was required for every pipe, and what advantage there was in whitewashing.

Mr. HADLEY replied that, though there was a certain amount of wear on the mandril, it was not necessary to discard it after each rolling. He also explained that the pipes were dipped and wrapped in Hessian cloth saturated with bitumen, as a protection against external corrosion. They whitewashed the pipes before dispatch to prevent their sticking together during transport or storage.

Mr. DAVID GARRIE (Burntisland) asked if there was any alteration in the structure of the steel during the process of hot rolling. He had found steel mains more subject to corrosion than cast-iron mains. Was there any possibility of there being marketed in the near future a stainless steel suitable for mains? Had Mr. Hadley's firm tried aluminizing?

Mr. HADLEY replied that the change in structure of the steel during hot rolling was very slight. He could not agree that steel was more corrosive than cast iron. He did not see at the present much possibility of a stainless steel being used for gas mains. At present they manufactured stainless steel tubes for sugar factories, &c., but the cost of them was from 15-20 times that of the ordinary quality. They were experimenting with aluminizing, and were also producing a steel with a small percentage of copper for boiler tube purposes. Time was not sufficient, however, to gather information regarding their anti-corrosion properties.

Mr. M. DARLING (Cowdenbeath) said he had experienced trouble with steel mains not being made to the exact gauge.

Mr. HADLEY replied that this might be caused by a fault in the staving press. All his firm's pipes were accurately gauged before dispatch and the faulty tubes rejected.

Mr. D. CAMPBELL (Kelty) stated that he had recently replaced a 3-in. steel main with a 6-in. one. The 3-in. main had been in the ground for over 30 years and he was surprised at the excellent condition it was still in. He had noticed, however, that a ridge had formed inside the entire length of the pipe. Could Mr. Hadley explain the cause of this?

Mr. R. J. PHILP (North Berwick) said he appreciated the whitewashing of the pipes before dispatch. Some 30 years ago he had experienced considerable difficulty in the handling of wrapped steel mains due to their sticking together on their arrival. He considered steel mains, if properly laid, considerably reduced leakage.

Mr. J. M. DOW (Perth) stated that they had witnessed the film of a works which seemed to be full of opportunities for the industrial gas salesman, yet Mr. Hadley had not quoted a single instance where gas was used as a fuel. Could Mr. Hadley inform him if gas had been used in any of the processes illustrated?

Mr. HADLEY replied that they had used gas for several processes, but had found better control in the use of oil. The comparative costs were slightly in favour of oil, and they had to remember that the oil industry were also very good customers.

Mr. DAVID WARDEN (President) concluded the meeting by moving a hearty vote of thanks to Mr. Hadley and the Bromford Tube Company, Ltd., for the instructive lecture.

# A Retrospect of Ten Years of Standard Gas

E. Czako and E. Schaack, in "Das Gas- und Wasserfach," 1933, 76, 153-167 (Mar. 11), present an account of the measure of success realized at Frankfurt in the supply of gas of uniform quality.

The German specification intended to secure definite and uniform characteristics in town gas has been gradually extended from 1921 onwards, and is now as follows:

The mixture of coal gas and water gas will be classed as normal if its calorific value lies between 419 and 450 B.Th.U. per c.ft. Dilution of the coal gas must be effected by addition of a combustible gas and not by addition of excessive amounts of a gas rich in nitrogen and carbon dioxide (*e.g.*, waste gas or producer gas). The following maxima must not be exceeded: Specific gravity 0·5, oxygen 0·5% (or if at all possible 0·2%), $H_2S$ *nil* (in extreme cases, for long distance gas transmission, 0·8 grains per 100 c.ft.), $NH_3$ 0·2 grains per 100 c.ft., naphthalene $\frac{z}{P}$ grains per 100 c.ft. (where P is the initial absolute pressure in atmospheres in long distance supplies). The contents of inerts ($CO_2 + N_2$) *should not* exceed 12%. Uniformity within the following limits must be maintained: Calorific value (*a*) absolute value ± 2½ B.Th.U. per c.ft., (*b*) fluctuations ± 7½ B.Th.U. per c.ft., specific gravity (*a*) absolute value ± 0·012, (*b*) fluctuations ± 0·015. Uniformity in pressure must also be maintained. Where a constant Wobbe Index $\frac{\text{C.V.}}{\sqrt{\text{Sp.gr.}}}$ is adopted, fluctuations of ± 1·5% in the index are permissible.

The upper calorific value limit corresponds to a mixture of 30% blue water gas and 70% coal gas, and its characteristics are: Sp.gr. 0·445, $CO_2$ 3%, $C_nH_m$ 1·5%, CO 16%, $H_2$ 55·5%, $CH_4$ 18%, $N_2$ 6%.

The object of the authors is to answer the questions:

(1) How has standardization of gas quality worked out in practice during the past ten years?
(2) Can the limits be maintained in practice?
(3) Is the specification adequate in view of the present-day manifold applications of gas, and to what extent do further requirements seem desirable?

(1) Charts are presented showing the number of undertakings distributing gas at various calorific values in 1921-22, 1925-26, and 1929-30, and a comparison is made with conditions in Great Britain in 1930-31. It appears that, in each period, the average calorific value of the gas sold in Germany has been above the upper limit fixed for standard gas. Thus the average calorific values of the gas sold in the three periods were 461, 471, and 465 B.Th.U. per c.ft., compared with the figure 487 B.Th.U. per c.ft. which the authors ascribe to Great Britain during 1930-31. There is, however, a gradual increase in the ratio which the quantity of standard gas bears to the total gas sold, the percentage being 53% in 1929-30 compared with 36% in 1921-22. In 1929-30, 82% of the gas sold had a calorific value between 440 and 492 B.Th.U. per c.ft.

(2) There has been, at Frankfurt, no difficulty in meeting the specification as regards $H_2S$, $NH_3$, and naphthalene. Daily fluctuations in the average calorific value have been kept within ± 1·6% of the adopted value, and monthly fluctuations within ± 0·5%. Specific gravity fluctuations and content of inerts were also kept within the prescribed limits.

A further criterion of uniformity is the Wobbe Index, constancy of which indicates constancy in the number of units consumed by an appliance in unit time. The mean Wobbe Index at Frankfurt is (when the C.V. is expressed in B.Th.U. per c.ft. at 30 in., 60° F., satd.) 636, fluctuations being within the range −1·8% to +3·0%. The specification allowances for daily fluctuations in calorific value and specific gravity would permit of variations of ± 3·4% in the Wobbe Index, whereas the specification only allows ± 1·5%, and is thus in need of amendment.

The Wobbe Index is, in view of the manifold applications of gas, too simple to suffice, by itself, as a criterion of uniformity of the gas. The Ott number, measured by noting the settings of the scale of the primary air inlet of a Teclu burner at which flickering and backfiring occur is a better criterion, and if it be kept constant there is good evidence that the quality of the gas is uniform. In practice, with a flicker point of 58 scale divisions, variations of ± 2 are permissible, and with a backfiring point of 63, variations of ± 2½ are allowable.

(3) A comparison is made between the properties of various types of town gas and reference is made to the need for further intensive study of ignition velocity and its significance. The content of inerts is an important factor in the

quality of gas, and the standard specification should be altered so that a definite limit of 12% is fixed for inerts instead of a mere statement that the inerts *should not* exceed 12%.

The upper specific gravity limit should be fixed at a slightly higher value than 0·5, since the specific gravity of mixed gas rich in carburetted water gas and of water gas from coal exceeds this value. A lower specific gravity limit should be included in the specification.

The relationship between the Ott number and (1) the Wobbe Index, (2) the CO content, (3) the ratio of hydrogen to carbon monoxide, and (4) the ratio of methane *plus* heavy hydrocarbons to carbon monoxide is discussed, and a plea is put forward for the inclusion in the specification of a clause governing the Ott number of the gas. The test-burner required for the determination of the Ott number can readily be standardized.

A new additional criterion is proposed—namely, the ratio $\frac{\text{Wobbe Index}}{\text{Ott Number}}$. This criterion increases progressively with increase in the blue water gas content of a mixture of coal gas and blue water gas and would have a value of approximately 10·0 in British units for mixed gas of a calorific value of 450 B.Th.U. per c.ft.

# Town-Gas 'Bus in Daily Service

The vehicle demonstrated at the British Industries Fair at Castle Bromwich, and now in regular service on one of the Birmingham routes, is a Guy 6-cylinder 32-seater single-decker 'bus, the engine of which has been modified to enable gas to be used as a fuel in an efficient manner. The main modifications consisted of the following:

(*a*) The substitution of the special air/gas mixer in place of the standard petrol carburettor.
(*b*) The compression ratio was increased by substituting a specially designed engine head, which enabled the ratio to be increased to about 6·2:1. (After the Fair this was altered, as is mentioned later.)

The chassis is fitted with seven alloy steel bottles, each 5 ft. 10 in. in length by 8 in. external diameter, and having a free gas capacity of approximately 350 c.ft. at a working pressure of 3000 lbs. per sq. in.—*i.e.*, the total storage at the maximum working pressure approximates 2450 c.ft. of free gas.

These storage bottles are composed of nickel chrome molybdenum steel, are manufactured by Messrs. Vickers-Armstrongs, Ltd., and are inter-connected by a seamless drawn steel tube with stop valves fitted at convenient positions for charging from an external supply and also for cutting off the main supply to the engine.

In the driver's cab, a pressure gauge is installed, by means of which the driver is able to ascertain the capacity of his storage at any time, and a stop valve on the outlet of the storage system is arranged for cutting off the gas supply in case of emergency.

The supply at full pressure is controlled by means of a two-stage diaphragm reducing valve placed between the outlet of the high-pressure storage system and the inlet of the air/gas mixer. By means of this valve, the pressure is reduced in the first stage from the working pressure in the cylinders to approximately 2 lbs. per sq. in., the second stage reducing the pressure to slightly below atmosphere. In other words, a negative pressure is required to open the second stage valve, in order to admit gas to the air/gas mixer.

This is arranged so that when the engine is stationary, all gas supplies are automatically cut off, but as soon as a slight depression takes place in the induction system of the engine, the gas valve in the second stage reducer opens and admits gas to the engine through the air/gas mixing valve, according to the throttle opening.

The vehicle referred to, fully laden, weighs about 9 tons, and in its ordinary service between the city and the Fair carrying a full load of 32 passengers, it was found that the gas consumption approximated to 38-40 c.ft. per mile; thus a full charge was capable of running the vehicle under normal conditions for a distance of about 60 miles.

### Charging Arrangements.

The method of charging the cylinders on the vehicle was as follows: Town gas taken from the ordinary low-pressure main was compressed in a 4-stage compressor (the particular machine used at the Fair being a Belliss & Morcom machine of special design) up to a pressure of 5000 lbs. per sq. in., at which pressure it was stored in special cylinders conveniently arranged at the filling station.

The storage cylinders in use at the Fair consisted of five alloy steel bottles manufactured by the Chesterfield Tube Company, Ltd., each having a capacity of approximately 1650 c.ft. of free gas at a working pressure of 5000 lbs. per sq. in.

From this battery of storage cylinders, the vehicle cylinders were filled through a charging pipe connected to a valve which limits the pressure in the vehicle cylinders to 3000 lbs. per sq. in., this valve being automatic and shutting down directly this working pressure is reached. The time taken for completely filling the vehicle from the battery of storage cylinders is about five minutes, although this operation can be carried out in three minutes if required.

A similar filling station is fitted up at the Windsor Street Works of the Birmingham Gas Department.

The results of tests taken over the period during which this vehicle was in operation under actual service conditions, and also for demonstration purposes, are as follows:

Taken over the whole period of the Fair, the gas consumption amounted to about 70 c.ft. per mile run, this figure including idling time, during which the vehicle was being demonstrated, and also a large number of short runs round the Fair grounds.

While operating under public service conditions, the gas consumption appears to be about 50 c.ft. per mile run.

Since the Fair, the Birmingham Gas Department has obtained special permission from the Ministry of Transport for the continuance of the vehicle in public service, and at the present time it is in daily service in Birmingham and is working very satisfactorily. The compression ratio has been increased to 6·8:1, and this appears to have produced a definite improvement in the performance, both in power output and efficiency.

# - - - GAS AT THE - - -
# IDEAL HOME EXHIBITION

## A Comprehensive Display of Appliances

Gas plays as large a part as ever this year at the " Daily Mail " Ideal Home Exhibition, which was opened at Olympia on March 29 by Mrs. Stanley Baldwin. The service which gas can render in the modern " ideal home " is most ably demonstrated by many of the well-known firms, whose displays are well worthy of the Industry the needs of which they serve.

### The London Gas Exhibit.

Seven large London Gas Companies are represented by the London Gas Exhibit Committee, who have combined to demonstrate on their stand the many labour-saving possibilities of gas in the home. The Companies co-operating in this very fine display are: The Gas Light and Coke Company, the South Metropolitan Gas Company, the Commercial Gas Company, the Croydon Gas Company, the South Suburban Gas Company, the Tottenham and District Gas Company, and the Wandsworth and District Gas Company.

The stand is finished in an attractive colour scheme, with a wide range of appliances displayed both inside and out, and in conformity with the modern tendency for colour and cleanliness in the home, the apparatus shown are designed to reduce cleaning to a minimum and enhance the decorative effect in any room from the kitchen to the bathroom. Every branch of the domestic uses of gas—lighting, space heating, cooking, water heating, ironing, and refrigeration —is demonstrated with the most modern fittings and appliances, each in its appropriate setting, thereby giving a comprehensive idea of how they would appear in the home. A special feature is made of coloured gas fires, indicating the variety and attractiveness of these necessary additions to the home, and, as an alternative, a special grate designed to burn solid smokeless fuel is shown. This special grate requires no wood or paper for kindling, as a gas burner is incorporated for this purpose. Of particular interest is a new Gas Light and Coke Company conversion set for the old-fashioned type of solid-fuel wash copper, embodying the latest design of gas burner. The lighting of the stand is excellent, a wide range of attractive fittings being shown, distance-controlled by means of switches. A special display of portable heaters and a variety of small " plug-in " appliances is included. The " G.L.C. " greenhouse heater is an interesting apparatus. It is a simple unit suitable for warming greenhouses, sheds, workshops, &c. A flue pipe is attached to the head of the unit which contains a burner, and in traversing this pipe the flue gases give up their heat before they are led into the outside air. The flames cannot be extinguished by wind. There is no water circulation and a small gas supply pipe only is required. It is provided to meet the need for a cheap appliance, and it should not be used where there are very delicate or valuable plants.

Practical demonstrations of cooking, laundry work, and ironing are running continuously on the stand, while an artist attracts the public's attention by a series of lightning sketches of gas subjects.

### A Noteworthy Display.

A few notes on some of the more interesting appliances exhibited by the many gas appliance manufacturers at the exhibition will serve to show our readers how ably represented is the Gas Industry at this most famous of home exhibitions.

Following on the special effort made at the British Industries Fair recently, in which a very fine show of water-heating appliances was successfully staged, Radiation Ltd. have made gas water-heating a big point in their display at Olympia—although the main attraction, as usual, is the " New World " " Regulo "-controlled gas cookers.

A particularly fine selection of " New World " cookers and ranges is being shown in the various delightful colour schemes adopted by the associated manufacturers. We understand these colour ranges with the " Beau " enamel finish were not put out until a great deal of research and experimental work had been undertaken, and the result amply justifies the expenditure. The new 1933 features of embossed sides and door panel, and hexagonal oven door knob, are incorporated as standard. The high glaze of the porcelain enamel entirely eliminates all cleaning difficulties —a mere rub with a damp cloth will preserve the original brightness. The chromium-plated taps also carry through this keynote of labour-saving and attractiveness of appearance.

As before, cookery demonstrations are given on the stand every morning and evening, and at various times whole-dinner menus will be cooked in a locked oven, entirely without attention.

The gas water heaters shown include the well-known " Sunhot " and " Equator " all-purpose water heaters, for providing baths and all the hot water needed in the home, and also the smaller models specially suitable for the kitchen sink, lavatory wash-basin, for dentists' and hairdressers' use, &c.—*i.e.*, the " Newlyn," " Lynton," " K.C.U.," and " Rill."

The standard Radiation " Beam " gas fires, with the makers' own individuality, again have a good showing; and the theme of " colour in the home " has been carried out in the finishes available, which are in keeping with the schemes of decoration of the most modern rooms. The " Panella " fire, which is peculiarly adapted to the needs of architects, also has the advantage of " Beam " radiants, as incorporated in all the fires marketed by the Radiation makers. The beneficial quality of the heat emitted by the " Beam " radiants has now become widely known and approved by the public. It should also be mentioned that the radiants fitted to the " Sunbeam " gas fires are of the " Beam " type.

A further result of the research work constantly being carried out by Radiation Ltd. in the improvement of the " quality " of warmth is shown in the new home clinical gas lamp, several models of which are shown on the stand. This attractive little clinical lamp and heater has already made great strides, and demonstrations of the use of the lamp will be given on the stand. This lamp might be considered the " baby " model of the original large hospital and clinic lamp, earlier introduced by Radiation Ltd. and in use at the London Light and Electrical Clinic.

There is again a representative exhibit of the " Nautilus " gas fire flues, so that those interested in building their own homes will be able to see how considerable constructional savings can be effected in using these blocks.

### All-Enamelled Cookers.

The display of Messrs. R. & A. Main, Ltd., of 48, Grosvenor Gardens, S.W. 1, comprises examples of Main porcelain enamelled gas cookers in cream and green and other coloured and mottle finishes on the " Mainservor," " Maintenance," and " Wessex " types of cooker, the special points being easy cleaning, economical operation, and self-regulating ovens. The Main gas fires are most attractive, the " Gloria " being a splendid example of modern gas heating: the model shown is in chromium-plated satin finish, distinction being given to the fireplace by the superimposed marble forming the surround. This fire is made in nine and twelve radiant sizes, with Duplex burners, and offers great possibilities to the architect or builder in his decorative treatment of the fireplace. It is conceived on a skilful handling of circles and half circles in various checks to give light and shade. The flat planes, the absence

of protruding canopy, and the introduction of a very shallow fender all ensure minimum projection into the room space. Also displayed are the " Unimain " and " Cinemain " gas radiators, together with the " Romain " panel heater of a new and improved design for either the home or the garage; in the latter case not only are the flames completely enclosed, but the heat source is doubly protected against petrol fumes or combustible substances of any kind.

A range of water heaters is shown, including the " Domain " and the " Thermain " types in various sizes. The " Domain " and " Domain-Junior " are of novel design, specially suited for installing in restricted spaces. They are of circular shape, and the front plates are of porcelain enamelled sheet steel, and the sides durable sprayed enamel to match. All fittings are chromium-plated, while parts in contact with the water are of tinned copper. The " Domain " holds two gallons, and has a maximum rated gas consumption of 10 c.ft. per hour. It heats up the contents in about 25 minutes to 150° F., and as soon as the water is hot the thermostat reduces the gas to the rate of less than 1 c.ft. per hour. A gas adjuster is incorporated for suitably regulating the local gas pressure. The " Domain-Junior " is exactly similar to the " Domain " except that it is not heat-insulated.

An interesting new fire on Messrs. R. & A. Main's stand is the " Crichton," the extra height and arched form of whose radiants promote longer flame travel and a greater radius of heat—upwards and downwards, as well as horizontal. It is supplied in a number of attractive finishes.

### Hot Water and Central Heating.

Hot water supply and central heating for all household and industrial purposes are included in the display of Messrs. Thomas Potterton (Heating Engineers), Ltd., of Cavendish Works, Balham, S.W. 12.

One of the special features of their exhibit this year is the new " Rex " gas-fired boiler. This is a completely enclosed boiler all-enamel finished externally, having as an integral part the necessary flue baffle which facilitates neat and easy means of connection to the brick chimney, or alternatively of discharging into the open air. This flue baffle is somewhat of a new departure in such appliances, and surmounts the top of the casing in the form of a hood over the full area, being supported upon cast-iron brackets from the top plate. This facilitates a straight connection to the stack, down-draught into the gas passages within the boiler being prevented by the usual form of plate extending over the openings which occur in the up-take through the sections.

A working example of central heating upon the low-pressure gravity system is shown in operation with a No. 19 enamelled " Victor " boiler and distance-control thermostat operating " Classic " radiators upon an overhead circuit.

On the non-active side of the heating section; an example of combined gas and coke heating occurs in the form of an enamelled " Classic " boiler with indirect cylinder incorporated with an " Empire " water heater demonstrating the equipment that is suitable for a modern villa containing up to 500 sq. ft. heating surface in radiators, and providing domestic hot water supply for two baths in addition to the ordinary culinary requirements.

In connection with central heating, an " Ideal Britannia " coke boiler also occupies a prominent place, together with domestic coke boilers which can also be used for hot water supply in conjunction with small systems of radiators for the warming of halls, passages, &c. On the " gas " side the " Empire " and " Emperor " thermal storage water heaters are well represented, both in single and twin form. As a working example, an " Emperor " thermal storage apparatus is in action, operating a secondary circuit for towel rail, for which this particular form of storage water heater is eminently suitable. It provides hot water supply to a sink, which demonstrates the bi-metal thermostatic control which is now recognized as a most reliable valve for this purpose.

As a smaller example for the villa type of residence where coke is required for the winter load, with gas as the housewife's help in the summer, a " Domestikatum " coke boiler is fitted up in conjunction with an " Empire " rectangular set having dual connections so that either or both can be in action according to the varying requirements from time to time.

An interesting development in central heating is the new radiator shield with dust filter, an example of which is fitted to one of the radiators in operation on the stand.

Also shown is the firm's automatic caterers' boiler, which requires no attention, except to light the gas, and in about eight minutes—with the automatic control—the boiler is ready for use, supplying boiling water.

The firm's exhibit is illuminated by gas, having a series of inverted incandescent burners loaned by the South Metropolitan Gas Company, with which are incorporated automatic switches. The stand being opposite the electrical exhibit, they have made a special feature of the lighting to support the London Gas Exhibit.

### " Ideal " Boilers.

A comprehensive exhibit of " Ideal " domestic boilers is to be seen on the stand of the National Radiator Company, Ltd., of Great Marlborough Street, W. 1, including " Classic " boilers and radiators for central heating, the " Rayrad " flat-surfaced radiant radiator, together with the " Ideal Cookanheat," which combines the advantages of an independent boiler with cooking by coke or gas. Also shown are " Ideal " towel rails in chromium and nickel plated finish and numerous types of radiators.

The " Ideal " gas boiler for central heating or indirect hot water supply embodies many interesting features. The luminous flame burners obviate gas and air mixing in the burner, so that possibility of back-firing is eliminated. The air necessary for combustion mixes with the gas in the well-proportioned combustion chamber, resulting in quiet, fan-shaped flames. The apparatus is finished in grey mottled enamel. A control of the relay type is provided, very sensitive in action and operating within fine limits. The by-pass set-screw under the control valve permits regulation of the gas required to support the self-pilot flame. When desired, a room thermostat, in addition to the boiler thermostat, may be connected in the secondary circuit, while the main gas supply can be automatically switched on and off at predetermined hours by fitting an eight-day clock control in a convenient position in the supply main between the meter and the governor. A feature of the " Ideal Cookanheat " is the gas attachment which allows the full use of the oven and three boiling rings independently of the fire, or will act as an auxiliary means of heat if the fire is low.

A display of instantaneous gas water heaters is to be seen on the stand of Messrs. Ewart & Son, Ltd., of Euston Road, N.W. 1. Their new " Vivo " water heater, at the turn of the tap, provides hot water instantly to the kitchen sink or to the bathroom or bedrooms. Also shown is the " Califont," similar in action to the " Vivo," while for direct bath supply are the " Royal " and " Victor " geysers. The " Allhot " is a simple and inexpensive heater for the kitchen. Also displayed are coloured porcelain enamelled bathroom suites and accessories in great variety.

Porcelain enamelled geysers in white and several art shades for baths, sinks, lavatory-basins, &c., are to be seen on the stand of Messrs. New Geysers, Ltd., of Addington Square, S.E. 5. Gas appliances similar to those displayed by the Croydon Gas Company in their recent hot water " push " (referred to on another page of this issue) are exhibited in most attractive finishes.

The exhibit of the London and Counties Coke Association, of 9, Grosvenor Gardens, S.W. 1, is devoted exclusively to domestic smokeless, sootless, and labour-saving appliances. Open coke fires in operation are the " Metro," the " Kaye," and the " C.C.," the latter being convertible by the removal of a front plate into a gas fire suitable for intermittent heating purposes.

### A Coke Display.

Another exhibit shows how coke-fired central heating boilers may be regulated by means of a thermostat placed in a key room in a building—whether a large house, a hospital, a cinema, or a block of flats. The thermostat controls a motor attached to the boiler dampers, which opens or closes the dampers according to whether the building temperature is tending to rise or fall. The apparatus is very simple and reliable, and is self-adjusting, being easily fitted to existing central heating installations. In the case of dual controls for coke-fired combined hot water and central heating boilers, for the house requiring partial central heating, the temperature is regulated by a room thermostat which controls a valve on the flow from the boiler to the system. By checking the supply of hot water to the radiators a room can be maintained at a steady warmth even under varying weather conditions. A motor on the boiler works the dampers, keeping the water at a constant temperature. The water temperature is controlled by a thermostat placed in the flow from the boiler to the calorifier, thus making it possible to maintain the hot water supply and yet regulate the room temperature. When a large amount of hot water is required for baths, the central heating is automatically shut off until the water again reaches the correct temperature.

The simple and inexpensive adaptation of coal grates to use smokeless gas coke is also demonstrated.

Included in the exhibit of Messrs. Sidney Flavel & Co., Ltd., of Eagle Foundry, Leamington Spa, are new designs of gas cookers in attractive coloured enamel finishes. The "Leamington" unit fires enable coke or gas to be utilized at will, while various types of "Metro" coke fires are shown. Two attractive products of this firm are in operation—namely, the "Flambeau" gas fire, which has the general appearance of a glowing solid-fuel fire, with flickering flames on the top of the fuel bed, and the "Metro-Log" gas fire in a pleasing setting. The firm's "Patriot" boiler for central heating and hot water supply is applicable to gas or coke firing, and several entirely new appliances in the form of gas-operated panel heaters are exhibited.

### Attractive New Gas Fire.

A gas fire which is attracting a good deal of favourable attention at the present time is the "Porteullis," which has already been reviewed in these columns when it first appeared. The fire is marketed by Messrs. Bratt, Colbran, & Co., of 10, Mortimer Street, W. 1, and a complete stand is devoted to a display of various types of this appliance. A distinctive type of radiant is used, which is the result of research carried out by the Gas Light and Coke Company. It is of a solid design, each radiant—or unit, as it is called—serving four burner nipples, and it is claimed that the fire shows a considerable increase in radiant and over-all efficiency. The fire is shown in portable form and also in a number of very attractive finishes and settings, particularly pleasing being one in chromium-plated finish in a surround consisting of strips of coloured glass.

The British Savall Company, of 52, Bedford Street, Strand, W.C. 2, are showing their "Cookall" one-burner gas-cooker, which embodies an oven heated externally. It is finished in vitreous enamel. The "Daisy" radiator is another gas appliance which not only warms the room, but boiling, frying, toasting, and grilling can be done with the same gas consumption.

Messrs. Electrolux, Ltd., of 153, Regent Street, W. 1, are showing an entirely new gas-operated refrigerator. It is air-cooled, and an automatic temperature control permits of ten different degrees of cold simply by the turn of an indicator. The "L.2," as it is styled, has a storage capacity of 2 c.ft., and is large enough for the requirements of the average household.

A selection of geysers is to be seen on the stand of the Pollard Engineering Company, and also a new design of combined storage apparatus.

### A Combination Range.

Messrs. R. Russell & Sons, Ltd., of Peel Foundry, Derby, are showing examples of their "New Herald" gas combination, which provides, in the one appliance, for cooking, heating, and water heating. It is stated to give a hot bath within half an hour of lighting up, while the circulating boiler may be connected up to an existing system. The gas fire is a useful addition to the amenities of the kitchen, while the new gas hotplate and oven embody many attractive features, the latter being automatically controlled.

The Thermal Syndicate, Ltd., of Wallsend-on-Tyne, give a graphic demonstration of the heat-resisting qualities of their new "Vitreosil" flameproof lustre cooking ware. There is also displayed a selected range of "Vitreosil" globes and bowls in various colours and designs, suitable for domestic gas burners, the heat-resisting nature of which is strikingly demonstrated.

The outstanding feature of the stand of the Eagle Range and Grate Company, Ltd., of Catherine Street, Aston, Birmingham, is the introduction of combination grates and ranges finished in coloured enamels. There are working exhibits of the new "Eagle" combination grate, the portable "Bijou" grate, the "Druid" portable range, and the "Eagle" gas coke range.

Messrs. Press Caps, Ltd., of Park Royal, N.W. 10, show examples of their washing machines, which are easily operated and compact, capable of washing absolutely clean two blankets or five sheets or twenty towels or an equal bulk of heaviest fabrics or daintiest lingerie in three minutes, using only hot water and soap.

Throughout the day demonstrations in the use of Rawlplugs and Rawlplug Bolt Anchors are being given on the stand of Messrs. Rawlplug Company, Ltd., of Cromwell Road, S.W. 7. Other items of interest are Rawlplug bathroom fittings in four distinct styles, Durium, Chromium, Vitreous Porcelain, and Enamulin; "Frostolac" crystal lacquer; "Durofix" waterproof adhesive; plastic wood in putty form; while for those who undertake their own home decorations are exhibited the complete range of Naylor paints, the well-known brushing "Belco," and "Fastain" for application to floors.

### Gas in the Model Homes.

As on previous occasions, gas finds its place in several of the model houses in the "Village of Ideal Homes," in all cases the appliances being tastefully arranged in attractive settings which greatly enhance the harmony and decorative effect of the furnishing schemes.

In the Gale House, the furnishing and interior decoration of which was carried out under the supervision of the "Woman's Journal," gas is used for a wide variety of purposes. In the drawing room is a "Metro-Log" fire in attractive setting, while the dining room is warmed by an inset "Red Sphinx" gas fire, by Messrs. William Sugg & Co. The kitchen is fully equipped with a "Eureka" gas cooker in green and cream enamel finish, while the combined gas refrigerator and store cabinet, also in cream with green linings, adds considerably to the decorative scheme. A G.L.C. gas-heated drying cabinet, thermostatically controlled, is also installed in the kitchen, and the water heating arrangements are carried out by an "Ascot" multi-point heater, with a small "Ascot" storage heater above the sink. On the upstairs landing is one of Cannon's "Beacon" radiators, while the bedrooms are all heated by gas, including "Panella," "Pano," and a fire in attractive blue finish to harmonize with the furnishing scheme.

The Coombe houses comprise two semi-detached dwellings erected by Messrs. G. T. Crouch, Ltd., under the supervision of Messrs. Douglas Kershaw & Co., Managing Surveyors, and, the one being all-electric and the other all-gas, an interesting comparison of the two domestic services is afforded, the public passing from the first house direct into the second. The all-gas house is fitted up by the South Metropolitan Gas Company on behalf of the London Gas Exhibit Committee, and is fully equipped with the latest domestic appliances throughout.

The lighting is very pleasing, being effected by means of "Metro" and G.L.C. burners, controlled by either "Newbridge" or pneumatic switches, while the convenience of being able to move small appliances, such as bowl heaters, table and standard lamps, &c., from room to room is well demonstrated by the liberal provision of plug-in points. In the hall is a "Metro" panel heater, while the drawing room is heated by a "Lumetro" gas fire in porcelain enamel with standard tap. The dining room has a Davis seven-radiant fire in beaten copper finish, and a "Metro" food warmer adds to the equipment.

The cooking is carried out by means of a Fletcher mottled enamel cooker, while other appliances here are a Keith gas iron, "Metro" multi-point water heater, Davis "Raybol" heater, Dean's washing machine in mottled enamel finish, complete with "Acme" wringer, and the new air-cooled L.2 gas-operated refrigerator, previously referred to on the stand of Messrs. Electrolux, Ltd. In the garage is one of Sugg's safety wall lamps and a Davis safety radiator. The needs of the bathroom are supplied by means of a "Metro" storage water heater, Davis clinical lamp, Ewart's gas-heated towel rail, and G.L.C. linen cupboard heater. In the bedrooms are Wilson and Mathieson's "York" fire, with gas ring concealed in the canopy, a "Metro" lace iron and curling tongs heater, and a "Metro" fire in porcelain enamel finish.

The G.L.C. linen cupboard heater, which is shown in the bathroom, enables any cupboard to be converted into an airing cupboard at low cost. The heating unit is fitted inside the bottom of the cupboard at the back, and connected up with the gas supply. The cupboard must be ventilated top, bottom, and through the shelves. Warmed air is delivered from the top of the heater from the moment the gas is lighted until it is turned off. When no hot tank is available this heater is indispensable. Its dimensions are 24 in. long, 11 in. high, and 4 in. wide. This heater can also be supplied with a rail for drying dish cloths, &c., the heater then being mounted on the wall of the scullery or kitchen, where it will then in addition contribute appreciably to the warming of the room.

Altogether the Gas Industry makes a very fine showing at the Exhibition, and the various displays well repay a visit.

# THE MECHANISM OF COKE . . . FORMATION . . .

*Recent Fundamental Work*

By Dr. G. E. Foxwell.

(*Continued from p.* 813, *Vol.* 201.)

Recent work has indicated that coal consists of four principal types of compounds: Hydrocarbons, resins, plant remains having a definite structure that have resisted decay, and ulmins, the ulmins being colloidal bodies, the degradation and condensation products of the cellular tissues and proteins. These bodies can be separated by solvents, assisted by removal of the ulmins from the plant remains by gentle oxidation. Incidentally this work appears to have shown that coal is not so complex a substance, when regarded from a sound chemico-petrographic angle, as it was formerly deemed to be. Prof. Wheeler, in a paper read before the British Association, has stated that: "As a result of numerous researches on banded bituminous coals, it has become increasingly clear that the great complexity of character of the initial coal-forming materials has not been transmitted to the resulting coal. During the process of coalification, and, as it would appear, mainly during the initial stages, those of decay of the vegetable matter, many of the more important components (in quantity) of the accumulated plant-material lose their identity, and by extensive alteration and interaction find common level as 'ulmin compounds.'"

### Caking and Non-Caking Constituents.

These researches have further indicated that, as would be expected, ulmins and plant remains have no coking powers and a coal consisting wholly of these bodies would not coke or even cake. The resins and hydrocarbons, on the other hand, possess definite caking properties. There is evidence that the behaviour of these bodies is not the same in all instances. Resins are composed of several different classes of compounds, and the hydrocarbons may be saturated or unsaturated. Exactly what is the rôle of each of these classes of bodies is not yet clear, but the researches of Cockram and Wheeler (J. Chem. Soc., 1927, 700) and Shimmura (J. Fuel Soc. Japan, 1932, 140) throw some light upon the subject. In this work the $\gamma$-compounds were further sub-divided by extraction first with light petroleum which removes principally hydrocarbons in solution, and then with ether into three fractions: $\gamma_1$, $\gamma_2$, and $\gamma_3$, the $\gamma_1$ being soluble in petroleum, $\gamma_2$ in ether, while $\gamma_3$ remains insoluble in either of the liquids. Wheeler and Cockram found that the $\gamma_1$ fraction from the clarain of the Parkgate seam contained 20% of resins and 40% each of saturated and unsaturated hydrocarbons. Shimmura, working on Japanese coals, found that the $\gamma_1$-compounds of Onedo coal consisted of approximately 10½% of resins, 39% of saturated hydrocarbons, and 48% of unsaturated hydrocarbons. The coking qualities of the Parkgate seam are well-known; the Onedo coal is of poor coking quality and is not used for coking. Shimmura also investigated the $\gamma_2$ and $\gamma_3$ compounds from two coals—one, Yubari, a good coking coal; the other the poorly coking Onedo coal. It is of interest to notice the different types of compounds contained in the two fractions.

| — | Acid Resins. | Ester Resins. | Resinols. | Resenes. |
|---|---|---|---|---|
| | % | % | % | % |
| $\gamma_2$-compounds— | | | | |
| Yubari . . . . | 35·93 | .. | 50·07 | *Nil* |
| Onedo . . . . | 23·49 | 21·91 | 45·29 | *Nil* |
| $\gamma_3$-compounds— | | | | |
| Yubari . . . . | *Nil* | 1·6 | 8·87 | 81·66 |
| Onedo . . . . | *Nil* | 5·64 | 33·18 | 51·75 |

Shimmura has investigated the influence of each of these extracts on the caking process on the laboratory scale, and has concluded that the $\gamma_1$-compounds exert an influence on the caking of the coal, the word "caking" probably being used here to denote the coherence of the particles, while the $\gamma_2$ and $\gamma_3$ compounds both affect the swelling or intumescence of the coal on carbonization, the action of the $\gamma_3$-compounds being more pronounced than that of the $\gamma_2$-compounds.

### Influence of Resin-like Compounds.

The importance of the investigations described in the preceding paragraphs lies in the definite evidence that has accumulated concerning the influence of the hydrocarbons and resins or resin-like compounds on the coking process. It may here be repeated (for the fact is of fundamental importance) that the beneficial action of these bodies does not depend solely on their presence or absence, but upon a definite physical action which they exert during the plastic stage. It is clear, moreover, that it is of the greatest importance that these bodies shall be retained in the coal until the plastic stage is reached; otherwise their action cannot take place. It seems to be in this direction that we can look for the explanation of the differences in coking power of coals according to the rate at which they are raised in temperature. The answer to the inquiry made earlier in this paper appears to be provided by Holroyd and Wheeler ("Fuel," IX., 86), who examined the resins and hydrocarbons in coal when the coal was raised in temperature very slowly indeed. Under these conditions it was found that the greater part of the hydrocarbon constituents distil unchanged below 300° C., while the resins partly liquefy and flow away from the coal and partly decompose into a heavy oil. The liquation and decomposition of the resinous constituents seem to occur between 330° and 375° C. independent of the nature of the coal. A change in the conditions, such as an increase in the duration of heating, influences the behaviour of the resinous constituents. This is evidently a highly important conclusion, and since the resinous constituents, according to the work of Shimmura, are primarily responsible for the swelling of coal the importance of the rate of heating immediately becomes explicable. It is, of course, not definitely excluded that the rate of gas evolution during the plastic stage may also play an important part, but even if that were found to be so, the rate of rise of temperature between atmospheric temperature and the temperature of incipient plasticity is highly significant.

If the part played by the fusible bodies, the hydrocarbons and the resins, during carbonization is not that of a binding material pure and simple, it becomes of interest to ascertain what that rôle is. Visual observation of the carbonization of a particle of coal reveals that the earliest stages of plasticity consist of the progressive softening of the coal so that it loses its angularity, and on account of the action of surface tension becomes rounded. Later, if the particle is large enough, the fluid matter is projected onto the surface in the form of tongues or globules. This extrusion or irruption is accompanied by the evolution of gas. For reasons which will be clear later it is important to prevent the too easy escape of this gas, as otherwise the swelling of the coal, which is the basic physical action in coke formation, cannot occur. Mott and Shimmura ("Fuel," VII., 479), after dismissing rate of gas evolution as the dominant factor in causing variation in swelling power, observed that during the period of coke formation the tar evolved increased to a notable extent. These authors believe that the first stage in coke formation is the liquation of a hydrocarbon oil onto the surface of the coal particles and the spreading of this oil over the whole surface to displace the air and effect a preliminary binding together of the coal particles. Just at the temperature at which the coal particles lose their shape and become converted into the semblance of coke there is a sudden evolution of tar, while considerable quantities of oil can be extracted from the preheated coal by treatment with ether. The suggestion made is that complete wetting with oil may be necessary in order to prevent the gas from escaping. The internal gas pressure, however, must be so high that it is difficult to accept this as sufficient of itself, although the suggestion is valuable, since the prevention of the escape of gas must be one of the chief functions of the fused material.

(*To be concluded.*)

# Restrictions on Council House Tenants

## Gas Light and Coke Company's Bill before the House of Commons Committee

(*Before the* MARQUIS OF HARTINGTON (*Chairman*), *Sir* CHARLES CAYZER, *Dr.* JOHN WILLIAMS, *and Mr.* WISE.)

As was perhaps to be expected, a great number of opponents were represented in the Committee Room when the proceedings opened, on Tuesday, March 28, on the Gas Light and Coke Company's Bill, the principal object of which is to prevent housing authorities within the Company's area of supply imposing conditions upon their tenants concerning the form of light, heat, power, or energy they may use. (A Bill by the Commercial Gas Company, having a similar object, is also to be considered by the Committee.)

The Gas Light and Coke Company was represented by Mr. W. E. Tyldesley Jones, K.C., Mr. F. J. Wrottesley, K.C., and Mr. Jacques Abady. The 40 local authorities who opposed constitute less than half the total number within the Company's area of supply, but they include the London County Council, the Middlesex County Council, the Corporations of East Ham, West Ham, Southend-on-Sea, Acton, Barking, Brentford and Chiswick, Hendon, Ilford, Barnes, and others, the Urban District Councils of Dagenham, Harrow-on-the-Hill, Hayes and Harlingdon, Ruislip-Northwood, Southall-Norwood, Tilbury, Uxbridge, and Wealdstone, the Westminster City Council, the Metropolitan Borough Councils of Battersea, Hackney, and Stepney, and the North Metropolitan Electric Power Supply Company.

There is also a petition by the Romford Gas Company, but this concerns another clause in the Bill, the purpose of which is to give the Gas Light and Coke Company power to break up streets and lay apparatus in the Romford district to connect up its area of supply on the east and on the west of that district. (The Romford Company's area of supply is situated between different parts of the Gas Light and Coke Company's area.)

The clause to prohibit housing authorities imposing restrictions on tenants reads as follows:

> (1) A housing authority shall not in or in connection with the selling, leasing, letting, or other disposal of any building or part of a building or land for the time being belonging or leased to them and being within the limits of supply—
>
> (*a*) make or impose any term, condition, or restriction with respect to—
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> (i) the form of heat, light, power, or energy to be supplied to or used in any such building or any part thereof or on any such land or in any building erected on any such land; or
>
> (ii) the taking from any particular local authority, company, body, or person of any form of heat, light, power, or energy; or
>
> (*b*) give any preference or priority to or subject to any prejudice or disadvantage any person on account of his taking or agreeing to take or not taking or not agreeing to take a supply of heat, light, power, or energy of any particular form or from any particular local authority, company, body, or person.
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> (2) Any such term, condition, or restriction as aforesaid which is in force at the date of the passing of this Act under or by virtue of any tenancy agreement or any resolution of a housing authority or otherwise howsoever and any term, condition, or restriction made or imposed after the said date in contravention of the provisions of this Section shall be of no force or effect.

At the commencement of the proceedings, Counsel for the Company asked that the Committee would not give a decision with regard to principle on the Gas Light and Coke Company's Bill before it had heard the Commercial Gas Company's case in support of its Bill, for the same questions would be raised in both cases. He added that the opponents to the two Bills were very largely the same. There was ample precedent, he said, for the course suggested.

Representatives of the opponents did not raise any serious objections, and the Chairman said the Committee would decide the course it would take later.

### CASE FOR THE COMPANY.

Mr. TYLDESLEY JONES then addressed the Committee, and first discussed briefly the activities of the Company. Its area, he said, covered 540 square miles, from (but not including) Windsor, on the west, to Southend-on-Sea, on the east, except that it was broken up by the area of supply of the Romford Company. It included the greater part of the County of London, and parts of the counties of Middlesex, Essex, Surrey, Berks., Bucks., and Herts. The capital issued was nearly £40,500,000, of which £27,202,000 was ordinary and preference stock and about £13,250,000 debenture stock. The basic dividend was 5%, and the authorized dividend was £5 12s.% on the present selling price of 8·6d. per therm (which was low for such an area), against a basic price of 11d.

Counsel went on to emphasize that the housing authorities carried out their duties partly at the expense of the ratepayers, but still more so at the expense of the taxpayers, and they were largely in the position of trustees, therefore. There was a tendency for some to use their powers for the benefit of their electricity undertakings, and to deny to the tenants of their houses and flats the right to use the medium they desired for lighting or heating. The evil had not been confined, however, to authorities which owned electricity undertakings; some, who had not such undertakings, had commenced to make agreements with electricity supply companies, by which they had bound themselves to insist upon their tenants using electricity and not gas; this was done to some extent because certain electrical undertakings had said that they would not give a supply to a housing scheme unless they secured something in the nature of a monopoly. The evil had grown to considerable dimensions.

There was also to be found a new hybrid kind of body which was called a Joint Electricity Authority, and such a body operated in the area of the Gas Light and Coke Company. It had deposited a petition against the Bill, but had not appeared upon it. On that Authority there was a very large representation of local authorities, and by virtue of the municipal element represented it was able to exercise a certain amount of influence on local authorities and to secure special treatment. Whether it did that always, or to what extent it was doing that, it was impossible to say.

Owing to the shortage of housing accommodation, people who required these houses could not pick and choose, but were to a large extent tied to such houses as they could get; they were necessarily the victims, or could be made the victims, of any intimidation or tyranny which might be exercised. Counsel added that he would prove facts which would justify the language he had used—which language was not his own, but had been used by a member of the present Opposition on the floor of the House of Commons.

Gas appealed peculiarly to the class of people he had in mind, not merely for heating and cooking, but also for lighting. In a room in a small house or flat, where perhaps there was a sick child, the lighting of a fire was sometimes almost impossible, not merely on the score of expense—though that was frequently a deterrent—but also because the room was so small that the fire would be in close proximity to a bed. A poor man of to-day liked to use gas lighting because of the heat it afforded, and that was a matter of the greatest importance to the poorer classes of tenant. Again, they attached importance to the fact that they could turn a gas light down to a glimmer if desired, as in a room where there were children, whereas the illumination from an electric light could not be reduced. These matters might appear trivial, but they did affect people whose expenditure on lighting and heating must be confined to within the narrowest possible limits. There were tenants who were not allowed to use gas, and who could not afford to use the electric lighting facilities that were provided, so that they had to use candles.

### PREVIOUS CASES.

Dealing with the history of this matter, Counsel recalled that in 1925 the Newport (Mon.) Corporation had promoted a Bill which contained a clause giving power to erect houses, shops, and so on, on certain lands belonging to it; the Newport Gas Company had opposed the Bill, asking for a provision to the effect that the Corporation should not impose, under the powers of that clause, any term, condition, or restriction in respect of the form of light, heat, power, or energy to be used in the buildings erected. The Town Clerk had said, in the course of the proceedings, that the Corporation's view was that in the public interest it should be free, but in reply to questions he had agreed that the Corporation had insisted upon the tenants of certain Corporation property entering into an agreement containing a clause that they should not use gas for lighting. He had attempted to justify the imposition of those terms by comparing the offer of the Electricity Department with that of the Gas Company. The ultimate result was that the Parliamentary Committee concerned had confined the powers of development to certain lands, and had inserted the provision which the Gas Company had asked for. When the Newport Corporation had promoted a further Bill, in 1930, for additional street works, it had itself applied that restriction to the further powers then sought.

When the Housing (No. 2) Bill was before a Standing Committee of the House of Commons in 1930, it was proposed that a clause should be inserted to provide that where contributions were made to local authorities the latter should not impose any term, condition, or restriction with respect to the form of light, heat, power, or energy used in the houses. There were several speeches in favour of the clause, and only one against. However, the clause was rejected.

At the report stage of that Bill an Honourable Member had referred to a letter from the Town Clerk of one Corporation to the Corporation tenants, pointing out that representatives of the gas company there had been canvassing; the letter informed them that under the terms of their tenancy agreements they were not entitled to agree to installations without the previous consent of the Corporation, that in no circumstances must they permit gas to be installed, that if it were installed it would be regarded as a breach of the terms of tenancy, and the Corporation would be compelled to serve notice to quit.

The only speech against the insertion of a restrictive clause on that occasion was made by the then Minister of Health,

who had said that behind the clause was the struggle between public and private enterprise. There had been no complaints from tenants, but only from private gas companies. The Minister had stated that the normal arrangement was to provide electricity for lighting and gas for heating and cooking. Counsel emphasized this because he was going to show that, not only were tenants not allowed to take gas for lighting in many cases, but sometimes they were prohibited from using it even for heating and cooking. However, the proposed clause was again rejected.

The Gas Light and Coke Company, he continued, owned houses, but it did not prevent its tenants from using electricity if they wanted to, and did not place them under an obligation to use gas.

Reference was then made to the case of the Kettering Gas Company, which had promoted a Bill to prohibit the Kettering U.D.C. imposing such restrictions, which Bill was passed.

The minutes of local authorities sometimes provided interesting reading, and in the minutes of the Fulham Borough Council, it was stated that a letter had been received from the Incorporated Municipal Electrical Association, drawing attention to the Kettering Gas Bill. It was interesting to note that the importance of a Council's position as landlords had been pointed out by an electrical association. How far the presence of some of the opponents to the Gas Light and Coke Company's Bill might be due to letters emanating from Australia House (the headquarters of the Incorporated Municipal Electrical Association), said Counsel, one could not be certain.

### Freedom of Choice.

The Gas Light and Coke Company did not ask for anything from tenants which would inure to its advantage and which would not inure equally to the advantage of electrical undertakings. Freedom of choice by tenants was asked for. There were instances in which electrical companies—and one had come forward unblushingly in this Committee room—had been able to make terms with a local authority whereby the latter required tenants of its housing estates to agree to take electric current under conditions as amazing as any he had yet come across. The Bill was based on the broad ground of public policy. The proper place in which to raise objection to the principle of the Bill was the floor of the House, but none of the opponents had raised objection during second reading. If there had been an objection on second reading it was obvious how it would have fared.

Counsel emphasized that the Gas Company was a very large ratepayer, and that in the year ended March, 1932, it had paid in rates in respect of the whole undertaking £512,863, and some of that money was used for the provision of the very houses from which some of the housing authorities desired to shut out the Company. Again, the shareholders were large income-tax payers, and had to bear their share of the national grants for housing. Yet the Gas Company had no voice in the election of a single representative of the ratepayers on the local authorities. If local authorities imposed tyrannous conditions it could take no action by vote to secure the return of more reasonable Councillors.

Of the 88 or 89 local authorities within the Company's limits of supply—only 40—less than half—opposed the Bill, and 25 of them owned electrical undertakings: all except six of the local authorities owning electricity undertakings opposed the Bill. Some of them claimed the merit that they were not as other men, for they did not impose restrictions against gas, and they seemed to suggest, therefore, that the Bill should not extend to them. But if they did not impose restrictions, why did they object? The tenor of many of the petitioners was to claim the right to do that which they said they should not do.

In some cases the gas pipes in houses had been cut, and the safety of persons in those houses had been imperilled; sometimes pipes provided by the local authorities at public expense had been rendered permanently unusable, because the authorities knew that the tenants wanted gas and would get it if they possibly could. The Bill as originally deposited had included a provision prohibiting a housing authority doing anything which would prevent an owner or occupier of land or buildings provided by the authority from taking any particular form of heat, light, power, or energy from any particular local authority, company, body, or person. There had been an objection that that provision was vague and indefinite, and perhaps there was a good deal of merit in that criticism. The object was to prevent such action as the cutting of pipes, the filling of pipes with liquid cement, and other physical interference with houses in order to render it impossible to obtain a supply of gas. The Company had decided to withdraw that particular provision because of its indefiniteness, but if it found hereafter that any of the authorities resorted to such practices as they had done in the past, it would not hesitate to promote a Bill to bring such action to the notice of Parliament and to ask Parliament to provide a remedy.

Dealing with specific cases, Counsel said that the Tilbury U.D.C. had entered into an agreement in 1922 with the Grays and Tilbury Gas Company—which undertaking had since been acquired by the Gas Light and Coke Company—whereby the Company agreed to lay mains to supply an estate, and to install in the houses at its own expense suitable meters and gas cookers. The Council was to carcass the houses, and certain financial arrangements were made. The Company, acting under the agreement, had spent nearly £23,000 in providing mains and services. In 1927, however, the Council was constituted an electricity undertaker, and had intimated to its tenants that they must not use gas, but must use electricity only. A large number of the tenants had complied, but some had stood out, and later a clause was inserted in the tenancy agreements requiring that there should be no alternative fittings. Notwithstanding the steps taken, some tenants had insisted on using gas. A notice was issued to the tenants stating the charges for the hire of the electrical fittings, and the tenants had been compelled to pay for fittings which they did not want and did not use.

The electricity undertaking had been experiencing serious losses, and the Gas Company had to pay rates to bolster up this competitive undertaking. In the minutes of the Council Committees there was evidence of the coercion of tenants, and there was one resolution that notice to quit be issued to tenants who refused to allow the Council's gas fittings to be removed after the installation of electrical fittings.

### Grossest Tyranny.

Counsel pointed out that the tenants had taken over the premises with the gas fittings in place, and the Council had no right whatever in law to remove them. He read numerous extracts from the minutes, and said he ventured to think that these minutes disclosed an exercise of what could only be described as the grossest tyranny. For the half-year ended March, 1932, the Gas Light and Coke Company was liable to pay £595 to the Tilbury Council for rates. That included a rate of 5½d. in the £ for the deficit on the housing scheme, and 4½d. deficit on the electricity undertaking. So that this very undertaking, to which customers had been transferred by these improper means, was making a loss which the Company had to subsidize. The Gas Company had become rather sore by that time, and had refused to pay the rates. It was duly summoned at the Police Court, and thus had the opportunity to make a public protest. For the half-year ended September, 1932, the rate for the deficit on houses was 5½d. and for the deficit on the electricity undertaking it was 6¾d.; for the half-year ended March, 1933, the rate for the housing deficit was 5d. and for the electricity deficit it was 7½d.

The tenants wanted gas, but were told that if they used it they would be evicted. In many cases the electric cookers installed in their houses were used as tables, and they had to pay a hire charge; some did all the cooking they could on a small gas ring. That was the state of things prevailing in England in the year 1933! He hoped that evidence would be given to the Committee by some of the tenants, in defiance of their landlords who had the right to evict them and threatened to exercise it. If there were any threat after that, he hoped the tenants of the houses would report the matter to somebody, and if necessary to the Gas Company, who would see that any threats used against tenants who gave evidence would be duly reported to the House; it was hoped that in that case the House would take action.

The Heston and Isleworth Council, which was a housing authority, and owned an electricity undertaking, had commenced to develop a housing estate. The Gas Company had offered (in 1932) to lay pipes to the houses and to fix gas cookers to be hired by the tenants, the effect of the proposals being that the Council would not incur capital expenditure. Subsequently, however, it was decided that the houses should be all-electric. A good deal of correspondence had passed, and the local Chamber of Commerce had taken a hand in the matter, pointing out that it was not considered in the best interest of the tenants that they should not have the option to use an alternative to electricity, and that the principle of pushing electricity to the extent of establishing a monopoly was wrong. Later the Gas Company had written to the Minister of Health referring to the proposal of the Council to exclude gas from the housing estate in question, and informing the Minister of the Company's offer, which offer was still open. In consequence a letter had been forwarded by the Minister to the Council, in which it was stated that it appeared that the Council would be well advised to give further consideration to an offer which would secure to the tenants an additional amenity without additional cost. Later (in February, 1933) the Borough Surveyor had approached the Company with a view to laying gas mains across certain roads before they were made up, so that in the event of it being decided in the future to lay gas mains throughout the estate the subsequent breaking up of the carriageways would be avoided.

The experience there, said Counsel, emphasized in the strongest possible way that obstruction was being placed in the way of the supply of gas by housing authorities.

### Current Limiters.

A case in which the authority concerned did not own an electricity undertaking was that at Wealdstone. The Weald Village housing scheme was commenced in 1925 and completed in 1927, and the houses were piped at the expense of the Council for the supply of gas. Mains and service pipes were laid by the Brentford Gas Company—which was supplying that area before amalgamation with the Gas Light and Coke Company. After 1930, however, some tenants had desired electric lighting, as, of course, they were entitled to do; but the Council, instead of having electricity provided for those who wanted it, had decided that all the tenants must have it. The Company had been asked to cap off the lighting points, but it had statutory obligations to supply, and could not accept instructions from the Council to remove fittings in a wholesale way, though it would remove fittings on instructions from the individual tenants. Counsel pointed out that some of the gas consumers were buying lighting bowls for the gas lighting by instalments, and the local Council's intimation that electric lighting was to be installed and the gas lighting fittings removed must have been a shock to them. He made great play of an arrangement with the North Metropolitan Electric Power Supply Company, which was to supply the electricity, to install

current limiters in the houses, limiting the total wattage to 180 at any time. This was equivalent, he said, to one 60-watt lamp and three 40-watt lamps, and he pictured a party being interrupted by a failure of the current when an extra light was switched on somewhere in the house; the current would be restored when the extra switch was turned off. The charge for the lighting service was to be 1s. 1½d. per week. A letter had been received from one tenant to the effect that he was perfectly satisfied with his gas lighting, and pointing out that whereas the charge for the electric lighting service was to be 1s. 1½d. per week, his gas had cost him less than 2s. per week during the last twelve months, the gas appliances being eight lights, two gas fires, one oven, one boiler, and one gas iron. The writer had been unemployed for a year and eight months, and his wife was employed by the Gas Company. Counsel admitted frankly that the letter was written at the instigation of an official of the Company.

Another point made by Counsel was that the tenants who were to be supplied with electricity would be required to sign an application form, and the terms empowered the Electricity Company to disconnect if current were used wastefully or at other times than when lighting was reasonably needed. He commented that if the suppliers took the view that everyone should go to bed at 11 a'clock, he supposed they or the current limiter would cut off the supply.

With regard to some flats which were being erected at Barnes, the Gas Company had approached the Council with a view to providing for installations, but a letter was received to the effect that the Corporation had its own electricity undertaking, and, *therefore*, it was not proposed to install gas in the new flats.

### Forced to Use Candles.

Again, at Fulham the Company had had the greatest difficulty in obtaining permission to carcass houses for cooking and heating. Eventually one flat was fitted as an all-electric flat, and one was fitted for gas (except for lighting), so that the tenants had been given a choice. The result was that, of 254 tenants, 197 had chosen gas for cooking and heating. All of them would have had to use electricity if the Company had not stuck to it. They were bound to take electricity for lighting, but many would prefer to use gas, and some were using candles because they could not afford electricity. He gathered that whereas one could put pennies into gas prepayment meters, only shillings could be put into electricity prepayment meters.

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**Wednesday, March 29.**

The opening of the case for the promoters was continued by Mr. Tyldesley Jones, K.C., who actually took six hours to do so, completing his statement by the luncheon adjournment.

Making it clear that it was no part of the case for the Bill that gas is superior to electricity for lighting—but claiming that both have advantages of their own, and that the tenants should have a free choice—and that it was not the intention to suggest that all the 44 opposing local authorites out of the 89 in the Company's area had placed restrictions upon the tenants on their housing estates in regard to the use of gas, Mr. Tyldesley Jones referred to a report by the Housing Committee of the London County Council which was presented on Jan. 28, 1931, dealing with the controversy that had then arisen and the complaints by tenants on L.C.C. estates that they desired to use gas but were prevented. That Committee reported that it was not unreasonable that gas and electricity supply authorities should be placed on an equal footing in the matter of supplying to Council Housing Estates provided that no additional charge on the rates was involved thereby. That report was adopted by the London County Council, but Mr. Tyldesley Jones said he was sorry to have to say that the tenants of all the Council's new houses had not been given the freedom of choice indicated. There were still houses or flats being put up where the Gas Company had not been allowed to put in a gas supply for lighting. Incidentally, reference was made to a statement in the Report of the Housing Committee in question that agreements had been entered into with gas companies prohibiting the use of electricity in Council houses, but Mr. Tyldesley Jones said he was not aware of any such agreement with the Gas Light and Coke Company except one which might be brought into that category, but which, in fact, did not involve a prohibition of electricity. That referred to the early development of the Becontree Estate, and an agreement was made in 1921 between the Gas Light and Coke Company and the London County Council whereby for a period of ten years the Company agreed to provide a supply of gas to a certain number of houses on the Becontree Estate, installing the piping and certain apparatus free of charge.

At the same time, the County Council did not guarantee that the tenants would use the gas nor was any restriction placed upon the tenants as to the use of electricity. The tenants were left quite free to arrange for a supply of electricity if they so desired. However, the period of ten years provided for in that agreement had now expired, and in the circumstances of the present time the Company did not think that even an agreement of that nature was in the public interest, and certainly it could not be made if the present proposals of the Company were sanctioned by Parliament. The view of the Company now was that gas and electricity should have equal opportunities and that municipal authorities should not have the power to put their tenants up to auction as between the gas and electricity supply authorities in the area in this manner.

### Public's Position.

The general position of the public as regards demanding a supply of gas from a gas authority was then dealt with, it being emphasized that under the Gas-Works Clauses Act of 1871 an occupier, quite independently of the owner, may demand a supply of gas if the premises are within 25 yards of a main, the owner's consent not being required. There was a clause in the Gas Light and Coke Company's Act of 1868 which made it incumbent upon the Company to obtain the consent of both the occupier and the owner, and in order to remove any doubt as to the Company's position under the general law, the Bill asked that this clause—Clause 63—should be repealed, thus definitely leaving the Company under the general law as far as this aspect of the matter was concerned. Again, referring to the clause in the Kettering Act, Mr. Tyldesley Jones said there might be some ground for argument that this was not retrospective; and in order to leave no doubt in the Gas Light and Coke Company's Bill he asked the Committee to make Clause 4—*i.e.*, the clause preventing local authorities from restricting the use of gas on their housing estates—retrospective.

Dealing with the petitions, Counsel said he did not propose to refer to every one, because so many were in the same terms. He would, however, have to refer to certain special cases; at the same time, the petitions against the Bill could be said to fall under three heads. (1) There was objection to the discretion of the housing authorities being interfered with. (2) It was argued that this matter should be the subject-matter of general legislation and ought not to be dealt with in a Private Bill. That point, however, said Counsel, was raised in connection with the Kettering Bill and did not prevail. (3) It was stated that there was good reason for a landlord prohibiting the use of gas in houses for lighting, because of the blackening effect upon the ceilings and the consequent need for more frequent re-decoration. That, however, replied Mr. Tyldesley Jones, was not due to anything in the gas, and was well known to be due to the upward current of warm air induced by the heat from the gas which carried dust with it and deposited it on the ceilings. The same effect was to be seen around hot water radiators and even electric fires near walls. Moreover, it would be said by witnesses for the Bill that artisan houses should be re-decorated more frequently than other types of houses, whether gas or electricity was used for lighting, on account of the greater amount of dirt brought into the houses on the artisan's clothes and in other ways than is the case with better-class houses.

Referring to a few of the petitions against the Bill which have special features, Mr. Tyldesley Jones first mentioned Tilbury, and remarked that, whereas the Tilbury Council stated that in those Council houses where electricity had not been installed the tenants had a free choice, it was the fact that 2012 houses out of 2242 had been electrically equipped, so that only in the case of a very few houses was there a free choice. Commenting on the filling of gas pipes with liquid cement on houses on the Tilbury housing estates, Counsel said that if there was a continuance of that, the Gas Company would apply to Parliament to have the matter dealt with, because here were gas pipes upon which public money had been spent being made useless by direct action of the local authority, according to the evidence available. In the case of the petition of the Wealdstone Council, it was asserted that this was not candid, and it could only be assumed that those who had drawn up the petition had not been aware of all the facts. The petition stated that there were no restrictions upon the use of gas for all purposes, yet at the very time that petition was being prepared the Gas Company had been notified by the Council that the gas lighting fittings in 316 houses would be removed and the tenants had been told they would be required to enter into an agreement with the North Metropolitan Electric Power Company for a supply of electricity for lighting. In the same way, the L.C.C. petition stated there were no restrictions on their tenants, but there was one housing estate where gas for lighting was prohibited.

### Preference for Gas Lighting.

The first witness for the promoters was

Mr. *Stephen Lacey*, Sales Controller to the Gas Light and Coke Company, who said that a very large proportion of the 750,000 prepayment meter consumers on the Company's mains had expressed a preference for gas for lighting. These were the poorer people, and they found not only was gas cheaper but it also gave a certain amount of heating effect in the room and was preferred for that reason also. It was also stated that, while there was an extra charge of 2d. per therm in the case of prepayment meters generally, there had recently been introduced a system whereby the charge for gas was the same as for ordinary consumers, but there was a rent in respect of the fittings and apparatus, instead of the latter being supplied free of charge. It was also stated that 75% of the prepayment consumers use gas for lighting. Speaking of Tilbury, Mr. Lacey said that reports had been received from the Company's district officers of several cases in which, by orders of the Council, the outlet pipes from prepayment meters in Council houses had been stopped up with liquid cement.

The cross-examination of Mr. Lacey was begun by the Hon. Evan Charteris, K.C., who represents the London County Council, who made the point that the L.C.C. does not restrict its tenants now, and put it to the Committee that it was an unheard-of thing for a Private Bill to be promoted asking for all local authorities in a particular area to be placed under a clause such as was proposed.

The point was put to witness as to whether he suggested a Council house should be wired for electricity and piped for gas.

Mr. *Lacey* said he did, provided the gas and electricity authorities were prepared to do this work without cost to the local authority.

The Hon. Evan Charteris asked about the position of the

fittings in the ceiling, and inquired how they could both be centrally situated. He also made the point that there would be capital expenditure lying idle because both gas and electricity could not be used for lighting at the same time. Moreover, these houses were for weekly tenants, and what was to be the position when one tenant had been using gas and the incoming tenant wished to have electricity?

Mr. *Lacey* replied that the lighting points for gas and electricity could be quite close to each other in the centre of the ceiling and only the particular fitting in use need remain in position. Moreover, these tenants, although weekly, were not constantly moving, and therefore the difficulty on this account suggested by Counsel would not arise. As to capital expenditure, this would be borne by the supply authorities and would be regarded as part of their normal expenditure in the endeavour to get business.

Questioned with regard to the Becontree agreement in 1921, Mr. Lacey said that whatever the conditions were at that time he would regard such an agreement as unwise now, because a local authority should not be allowed to set up a monopoly of either gas or electricity, even for lighting in municipal houses.

Speaking of Westminster—which Council the Hon. Evan Charteris also represents—it was put to Mr. Lacey that the only complaint had come from one tenant, and he turned out to be an employee of the Gas Light and Coke Company.

Another point made against the promoters, this time concerning the L.C.C., was that the resolution adopting the Housing Committee's report in 1931 was to the effect that as far as practicable gas and electricity should compete on equal terms provided there was no additional charge on the rates involved thereby. If, said Counsel, the Gas Company was willing to pipe houses and the electricity supply people were not willing to wire, surely the resolution became inoperative, because if the tenant required electricity the local authority would be put to expense in providing it.

Mr. *Lacey's* answer was that the tenant should surely be expected to make his own arrangements with the electricity supply people.

COUNSEL further claimed that the interests of the tenants and the ratepayers were being best served if the local authority was able to make an agreement either with the gas or electricity company which gave a cheaper supply by reason of a prohibition of one or the other, but Mr. Lacey expressed the view that freedom of choice for the tenant was far more important than a slight reduction in the charge for a commodity he might not desire to use.

# A Water Heating "Push" at Croydon

The Croydon Gas Company are believers in intensive campaigns with a view to popularizing the various types of domestic gas appliances, and only comparatively recently we noted in these columns their very forceful attack on behalf of the clinical gas lamp.

The Company's latest attack, in which very wide interest was evinced, was launched recently with the slogan "Abundant Hot Water," and aimed at counteracting the local electrical undertaking's efforts to "push" their water heaters. The accompanying photograph shows the striking bathroom setting, arranged in conjunction with Messrs. New Geysers, Ltd., of 25, Addington Square, Camberwell, S.E. 5, which was staged immediately inside and facing the main entrance to the Company's Chief Office buildings in Katharine Street, Croydon. Particularly effective was the display as a result of the attractive finishes in which the appliances were shown—cream, pink, green, and blue, in addition to the white porcelain enamel and bronze finishes. Above the appliances were the words, "Your Home Needs a Gas Water Heater."

The display was directed mainly at the instantaneous water heating load, geysers of various types and sizes being shown in operation.

### THE APPLIANCES.

Delivering a steady stream of hot water into a bath was the well-known "White Chief" geyser, in white porcelain enamel finish, chromium plated base and fittings, interlocking taps, and the "Access" base. This geyser is claimed to produce a 20-gallon bath in 10-15 minutes from first lighting the gas. Supplying hot water to an adjoining hand-basin was a "Mite" geyser, also with white porcelain enamelled body and chromium plated fittings. It provides abundant hot water for washing and shaving, while a mixing tap, rubber tube, and spray are provided for shampooing. This geyser, of course, is also suitable for fixing over a sink for washing-up purposes.

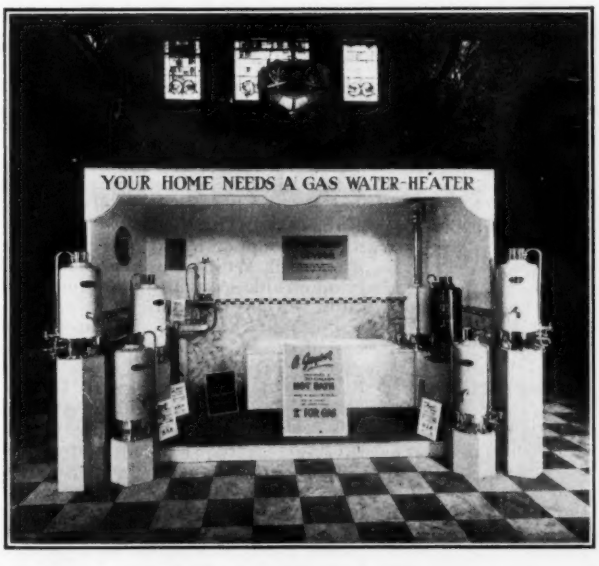
The "Super Reliance" geyser was also in evidence, which also provides a 20-gallon bath in 10-15 minutes, and is a very efficient appliance. Examples of the "Merit" geyser in the four standard finishes previously mentioned added a very refreshing note of colour to the display, and indicated how even the prosaic geyser may become a thing of beauty, harmonizing with any scheme of bathroom decoration. The Croydon Company are supplying the "Merit" geyser on hire terms including fixing and maintenance under a three years' agreement, and the scheme is going very well.

The "Reliafont" multi-point instantaneous heater is a new appliance included in the display. Shown connected up and in working order, it demonstrated how hot water may be supplied automatically to any number of taps throughout the house. In accordance with the usual principle, the opening or closing of any hot water tap in the system actuates an automatic valve on the apparatus, allowing the gas to be full on when hot water is being drawn, but closing it down to a small by-pass immediately the tap is turned off. The "Reliafont" is supplied in bronze finish or with porcelain enamelled body, and chromium base and fittings. Interlocking and "Access" base are provided.

### WINDOW DISPLAYS.

Leading up to this very fine display inside, the showroom windows, of which the Croydon Gas Company have a large number at their Chief Offices, are concentrated on the same theme. In each of the windows were further examples of the above-mentioned geysers, in their various finishes, while one window setting took the form of an up-to-date bathroom fully equipped with the water heating appliances and complete with a clinical gas lamp. The terms on which the various geysers may be obtained on hire or hire purchase were clearly set out, and slogans across the tops of the windows drew attention to the subject.

As usual, the campaign was ably supported by extensive publicity in the local Press, under the caption of "Abundant Hot Water." Here attention was drawn to the fact that there is no need to "make shift" with a limited quantity of water heated over a period; there is no need to economize in the use of hot water; with their comparative cheapness and unfailing supply, instantaneous gas water heaters place no restriction on the habits of a household.




**Croydon's Water Heating Display.**

Altogether the campaign was a very forceful, well organized, and telling one, on which the Croydon Gas Company are to be commended; and if the public of Croydon are not becoming "educated" to the many and varied domestic uses of gas, it is no fault of the Gas Company.

# THE "JOURNAL" TECHNICAL RECORD

*Which contains Reports of Meetings of Gas and Allied Associations*

## Southern Association of Gas Engineers & Managers

### Presidential Address of Mr. J. H. Cornish, of Bridgwater

**Annual General Meeting, March 31**

On Friday last, at the Hotel Metropole, Northumberland Avenue, W.C., the Annual General Meeting of the Association took place, under the Presidency of Mr. J. H. CORNISH, Managing Director of the Bridgwater Gas Light Company. At the business meeting the President delivered his Address, but this portion of the proceedings was preceded by a luncheon, at which Mr. Cornish was supported by his Chairman (Mr. A. E. Manchip), the Mayor of Bridgwater (Councillor C. Bryer), and the Borough Engineer (Mr. R. A. Watson).

There were a large number of visitors, and Mr. Cornish expressed his particular gratification at the attendance of several fellow Presidents, together with a strong contingent from the West of England to support him in the Chair. He also voiced his regret, and that of the Association, at the absence of Mr. Stephen Lacey, the Vice-President, who was engaged on a Bill in the House of Commons. The Presidents to whom Mr. Cornish alluded as being with them that day were: Mr. R. E. Gibson, President of the Institution of Gas Engineers; Mr. G. Dixon, President of the Manchester District Association; Mr. A. C. Hovey, President of the North of England Gas Managers' Association; Mr. T. H. Poulson, President of the Midland Association; and Mr. W. Grogono, President of the Eastern Counties Gas Managers' Association.

#### CORDIAL RELATIONS.

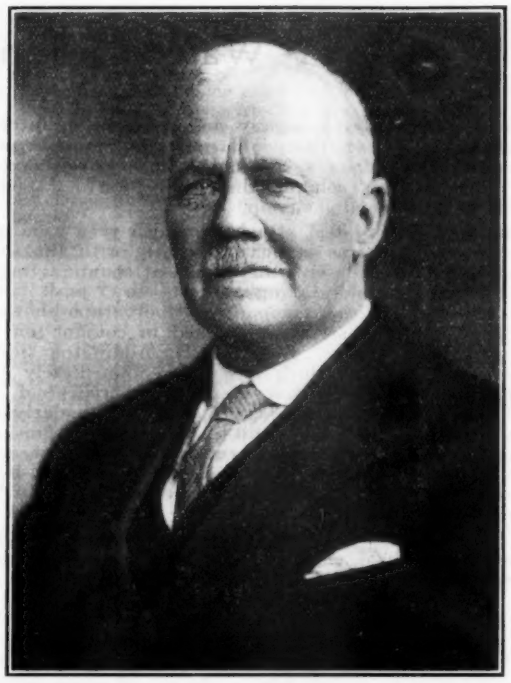
The PRESIDENT, expressing his pleasure at having the Mayor and the Borough Engineer with them, remarked that the relations of the Company with the Corporation of Bridgwater were of the most cordial character. The Company were entrusted with the whole of the public lighting of the town and surrounding districts.

Mr. R. H. RUTHVEN, of Ramsgate, the Immediate Past-President, proposing the toast of "The Visitors," said they were all looking forward to the opportunity of seeing later on something of the delightful West Country. He paid tribute to the long and honourable association of the name of Cornish with the Bridgwater Gas Company.

The MAYOR, in his reply, said that he looked upon the Gas Industry as being one of the most important industries in every sense of the word. To-day it was only in its infancy, and before it there lay a very great future. Bridgwater, which he hoped all present would be visiting later on, was a dear old town with about 17,000 inhabitants, and a very long history. He was quite sure from his knowledge of Mr. Cornish that he would carry out his duties as President to the greatest possible advantage of the Association, and that he would bring to bear on his position that wise judgment and discrimination that he had invariably shown in the work with which he had been connected. There had always been the most kindly co-operation between the Council and the Gas Company.

Mr. MANCHIP next submitted "The Southern Association," and, as a native of Bridgwater, associated himself with the expressions of gratitude and appreciation at the presence with them of the Mayor and Borough Engineer. He had been asked by his co-Directors—all business men—to ask the forgiveness of the members for their unavoidable absence. Like himself, they were all looking forward with pleasure to seeing the members and their lady friends in Bridgwater, and the date arranged was Friday, May 19. He assured them that a cordial welcome awaited them.

The PRESIDENT, in the course of his reply, voiced the gladness of those present at having Sir Francis Goodenough with them again after his very serious illness. Proceed-



**THE PRESIDENT.**
J. H. CORNISH, Bridgwater.

Mr. Cornish started his business life at the works of the Bridgwater Gas Light Company, under his father, who was Engineer and Manager for a period of 45 years. After five years, he left the employ of the Company and joined a branch of Messrs. Cromptons, Electrical Engineers, of Chelmsford, and had four years practical work on electrical matters, during which time he was employed on various plants throughout this country and America, gaining excellent experience. Having completed a big contract in New York, he returned to Bridgwater to superintend the erection of a new holder and tank. But, tiring of home restraints, as soon as the job was completed, entered the employ of Messrs. Cockeys, Gas Engineers, Frome, as draughtsman continuing there for two years, and obtaining useful knowledge and experience. From Messrs. Cockeys he was appointed Engineer, Manager, and Secretary of the Bridport Gas Company, Ltd., on the death of the late Mr. T. Giles, and remained in that office for nine years. In 1904 his father contemplated retiring, and Mr. Cornish was asked if he would apply for the position. He was duly appointed, and continued as Engineer, Manager, and Secretary for 26 years, until 1930, when his son was appointed to the position and he was appointed Managing Director, which offices they still hold. Thus the office of Engineer, Manager, and Secretary of the Undertaking has been continuously held for a period of 74 years by James Hughes Cornish (three generations). In 1895 Mr. Cornish obtained the 1st prize, Silver Medal, and Certificate of the City and Guilds of London Institute, Gas Engineering. He has been a Member of the Institution of Gas Engineers since the Presidency of the late Mr W. R. Chester (1896), while he has held membership of the Southern Association since 1895. He has been a Director of the Burnham-on-Sea Gas Company for many years, and is interested in several gas-works in the County and district as Consultant. At present he is Chairman of the local Chamber of Commerce. In connection with the Western Section of the Southern Association, he has been through the Chair, and held office since its formation. He is also on the Committee of the B.C.G.A. and the Federation of Gas Employers.

ing, he said that the Bridgwater Gas Company, so long as he could remember—and that was getting on for 50 years—had been favoured with an excellent body of Directors, and had always been ready to take part in anything for the good of the Industry. Had it not been for their encouragement, he would not to-day have been occupying the high position of President of the Association.

When the members assembled for business after luncheon, it was first agreed that the minutes of the previous meeting, as published in the "JOURNAL," should be taken as read and confirmed. The Annual Report for 1932, as circulated to the members, was also taken as read and approved, on the motion of Mr. D. C. CROSS (Lea Bridge), seconded by Mr. W. GROGONO (Croydon).

### MEMBERSHIP ROLL.

The following additions were made to the membership roll, on the proposition of the PRESIDENT, seconded by Mr. RUTHVEN:

*Ordinary Members.*

Mr. H. J. Hodder, Hampton Wick.
Mr. J. H. Hornby, Brentwood.

*Honorary Member.*

Mr. A. E. Broadberry.

The PRESIDENT, proposing Mr. Broadberry's election as an honorary member, pointed out that he was a Past-President, and had been a member for, he believed, fully thirty years. Unfortunately, he was at the present time suffering from ill-health, but they must all hope for his speedy recovery.

Thereafter the President was elected representative of the Association on the Council of the Institution of Gas Engineers for the ensuing year.

### PRESENTATION TO RETIRING PRESIDENT.

The PRESIDENT said he now had an extremely pleasant duty to perform—namely, to present to the Immediate Past-President a memento of his office. In Mr. Ruthven they had had a first-rate President, and they were much indebted to him for the way in which he had conducted the business of the Association during the past year. All those who had been privileged to attend the Ramsgate meeting in the summer would remember what a delightful time they had. He sometimes thought that, when they found such a President as Mr. Ruthven, it was a pity they did not elect him for a further period. In asking Mr. Ruthven's acceptance of a silver salver, he expressed the hope that it would long be a reminder to him of a pleasant year of office.

Mr. RUTHVEN cordially thanked the members for the gift.

### THE PRESIDENTIAL ADDRESS.

Mr. Cornish then delivered his Presidential Address, which will be found on following pages of this issue.

Mr. H. C. HEAD (Winchester), proposing a hearty vote of thanks to the President, remarked that Mr. Cornish obviously made an admirable President. The Address to which they had just listened came from a man who had had everything on his shoulders for many years, and whose success was due to his foresight, ability, and application to the affairs of his undertaking. Both the town of Bridgwater and the Gas Company were to be congratulated on the progress which the undertaking had made, and on the service given to the citizens.

Mr. C. F. BOTLEY (Hastings), seconding the vote, said that the Address revived thoughts of many of the problems with which they were faced to-day. One thing that had been mentioned by the President was a process which was being tried out at a works of about 250 million c.ft. per annum capacity, and which had met with a considerable measure of success. This was the neutralization of the ammonia contained in the liquor produced during carbonization by the acid flue gases arising from the regenerators. If Mr. Cornish could, during his year of office, bring forward any further information with regard to this process, they would be very much obliged to him. The President's remarks on wise expenditure reminded him that it had recently been suggested rather prominently that some of them were so impressed with the need for economy that they did not take all the steps they might to secure the utmost efficiency. It seemed to him that this was rather a libel on them. He did not believe there were any who were so shortsighted as to refrain in the interests of economy from spending the money necessary to secure efficiency. He was glad to note that the unit of 4000 B.Th.U. commended itself to the President.

The vote of thanks was carried with applause, and the President's acknowledgment concluded the business of the meeting.

## Street Lighting that Does Not Fail

*These two photographs, for which we are indebted to Mr. C. M. Croft, Chief Engineer and General Manager to the Wandsworth and District Gas Company, show some of the damage caused by an explosion at a chemical works at Mitcham on March 30. The views are of portions of Belgrave and Brunswick Roads—two roads adjoining the works where the explosion originated. In spite of the extensive damage caused to the surrounding property, the public street gas lamps were intact and the mantles unbroken. The lamps went into lighting automatically at the usual time without any attention. In the whole of the area in question two lamps only were damaged, and in each case the damage was caused by "direct hits" from falling débris, but the lamps were not put out of lighting.*

[*Photo. by Air Views, Ltd., Croydon.*

AERIAL VIEW OF THE BRIDGWATER GAS-WORKS.

# Southern Association

## *Presidential Address*

of

Mr. J. H. CORNISH,

Bridgwater.

### Introductory.

In venturing to address you from the Presidential Chair, I must claim your indulgence and ask that you will pardon all my shortcomings. I cannot hope to attain the brilliancy of many of those who have held this position, and I am conscious of my own limitations.

I think that this Association is very wise and very democratic in its views when it offers to every member the opportunity of accepting the highest position it has to offer. I have been a keen worker all my life, always thoroughly enjoying my daily task, but, having only had the charge of small or medium sized gas undertakings, I have not had the time or opportunity of carrying out research work, which is open to others who have had control of bigger staffs and consequently greater opportunities for studying and developing new ideas.

My remarks to-day therefore must be largely founded on the personal experiences of everyday life on a gas-works, and I fear I shall have nothing very new or startling to bring to your notice.

### Educational Matters.

The present generation is extremely fortunate in the educational facilities which are obtainable. I can truly say that my great regret in life has been lack of facilities for acquiring knowledge. Being one of a long family and not being of Scotch parentage, I had to take equal share in educational matters with twelve other little reprobates. Education is most desirable—nevertheless it is a fact that many of to-day's most outstanding figures are men and women who have had very little education. They have learnt the three "R's," and that is almost all. Their success in life cannot be attributed to any knowledge acquired at schools or "'Varsities." It can only be attributed to forces within themselves and most notably to their imaginations. Such men and women are, however, conscious throughout their lives of their own disadvantages, and realize the enormous benefits of education, provided only that it is conducted along correct lines.

This brings me to the splendid Education Scheme of the Institution of Gas Engineers and the facilities offered by the various correspondence colleges and classes.

May I strongly urge the coming generation of gas engineers, while they are young and have time at their disposal—and, I would add, the faculty of acquiring knowledge—to take every opportunity of equipping themselves in the technique of the profession they have adopted. I think it was in 1894 and 1895 that a well-known gas engineer, now in Yorkshire, then an assistant in the West Country, offered to help me in the matter of working together for the only Diploma then open to the Gas Industry —viz., the City and Guilds of London, Technological Institute Examination. As we were situated about 50 miles apart such help could only be by correspondence. However, by mutual help and assiduous work in 1894 he was awarded the Guilds Institute Certificate, Honours Grade, with silver medal and Salter's Prize, followed in 1895 by my taking the same coveted prizes. I make this acknowledgment to my old friend, without whose help and encouragement I think it is very doubtful if I should even have this small distinction to my credit. The Examinations for equal diplomas are now rightly considerably "stiffer" than they were 37 or 38 years ago, but the facilities for acquiring knowledge of the subjects are also very much greater. Therefore a higher standard of efficiency is demanded. I think it was Edison who said that "Genius was composed of 1% inspiration and 99% perspiration," which I translate to mean that we all may become geniuses by the sweat of our brows.

### Improving Trade.

We are meeting at a time when the depression in our industries is still very near to its lowest point, and we may congratulate ourselves that the Gas Industry has come through the trial without any substantial loss.

What are we doing? Are we fully prepared to meet the increased demands with which we shall certainly be faced as soon as industry generally reaches that real revival which all so ardently desire?

Extensions of manufacturing plant and of mains should certainly be undertaken by anyone who has any shortage or deficiency in any department. Prices are very favourable, and in the interests of labour and from patriotic motives such extensions are eminently desirable.

The time of revival is as eagerly awaited by our competitors as by ourselves, and it behoves us to close up our ranks and marshal our forces to meet the efforts that will certainly be made by them to extend their own markets, even in fields at present more or less securely occupied by us.

In ten years, according to figures published by the Central Electricity Board the consumption of electricity has increased 2½ times and now amounts to about 13,000 million units per annum. Allowing 7 c.ft. of gas as equivalent to one unit of electricity, this would require a gas-works capable of producing 91,000 million c.ft. of gas yearly, or, in terms of coal, a works carbonizing annually 6 million tons. I think you will agree that this would be quite a nice sized undertaking. We can hardly visualize this as a lost inheritance, but certainly a large proportion of this business would have been ours had we been the only pebble on the beach, and some would undoubtedly have been ours had our past policy been a little more aggressive.

### Organization of the Gas Industry.

Attention has been called by more than one observer of the Gas Industry in the United States of America to the fact that all gas interests there, instead of being scattered over several independent organizations, as they are in this country, are joined together in one comprehensive body with branches and sections to deal with different aspects of the subject matter. No doubt our own characteristics

as a nation will tend to the development of a slightly different system in this country. There is a great deal to be said for the maintenance of separate District Associations of Gas Engineers and Salesmen, but these should be regarded much more than they are to-day as geographical sections of the parent bodies—the Institution of Gas Engineers, the British Commercial Gas Association, and so forth.

The holding of a conference by the B.C.G.A. in different districts, from time to time, is no doubt an excellent means of bringing the services which can be rendered by gas prominently to the notice of the public.

But the union of the several bodies, the Institution of Gas Engineers, the National Gas Council, the Society of British Industries, and the B.C.G.A., with perhaps others into a central convention or conference held once annually would, I venture to think, be the best means of at once economizing time and effort and of convincing the Government and the public that gas interests are served by a large, important, and united body of Engineers, Managers, and Administrators.

### Publicity.

Publicity of the right kind is still an unsatisfied need of the Gas Industry. Electricity has captured the public imagination, and whether from this fact alone, or whether its interests are ably backed by the Minister in whose Department they have been placed, or whether the electrical industry is more active than we are in cultivating the lay Press, we must certainly develop some means of getting a position, and a good position, in the daily news columns not only of the great national organs of public opinion, but in the local newspapers each in our own district.

We have a splendid Technical Press, ever ready to advise and to urge us to greater activity, and constant in their claims of the great advantages of our commodity, but these papers have a strictly limited circulation and are largely read by the converted.

It must not be forgotten that a huge sum of public money has already been " sunk " or strung aloft in the overhead lines which we see daily growing around us, carrying current far and wide over the country side, and that every effort will be made to make this expenditure remunerative. Whether the change from direct current supply to alternating currents of a high periodicity will be of benefit to the consuming public or not is, I think, doubtful. We have already heard of various objections, and the effect of alternating currents in producing eyestrain and other nerve troubles is, I think, far from being disproved. Nevertheless, unless we get busy a large proportion of the new available supplies will find its way into the houses and firesides which ought to be served by us, and which could be served by us with a greater efficiency and at a less cost to the consumer and the nation than by our competitors.

The very replacement of old property by new, " slum clearance " in the form it takes in the lowest ranks of society, is a menace to us. Whether the supply of gas is actually prohibited or not, the new housing estates, rate aided, which are so marked a feature of every town to-day, are frequently wired for electricity, whereas the houses which they replace had no such provision. Further, in so far as the new property is occupied by the old tenants this constitutes a distinct loss of load to us.

What can be done to meet this threat of loss of business?

### Standardization of Calorific Values.

One of the expedients which has been suggested lately is the standardization of the calorific value of gas, as the voltage of electricity has been standardized throughout the country. Surely there was never a more fallacious analogy. The voltage and periodicity of an electric current supply depend upon a mere arrangement of wires upon a frame. The calorific value of the gas made by the distillation of coal depends upon the chemical and physical characteristics of one of the most complex substances in Nature. By all means let us restrict the number of calorific values " declared " throughout the country. There is clearly no justification for divergence over such close limits as 480 and 475.

Let us limit ourselves to such round figures as 500, 475, or 450 B.Th.U. per c.ft. But to endeavour to force all undertakings, using widely differing coals, carbonized in widely differing types of plant, and to meet widely differing markets, into one uniform standard would be, to my mind, to go against Nature itself and be a profoundly mistaken policy, completely nullifying all the liberties for which we contended so long and now conferred upon the Industry by the Gas Regulation Acts. The objects sought to be obtained by this proposed standardization are nearly, if not quite, all to be gained by due attention to the maintenance of a constant composition and above all constant and adequate pressure in the gas supplied to the points of consumption within each district. After all, in most of the apparatus now installed the adjustment of air to gas is made by fitters employed by the gas undertaking when the appliance is put in and at subsequent periods of inspection. If the composition of the gas and the pressure could be maintained absolutely constant there would be no need for the consumer to think of any attempt at adjustment. Indeed, already in the vast majority of cases he does not know that such adjustment is even possible, and he certainly does not want to be bothered about it.

So far as heat processes are concerned we have travelled quite a long way on the ideal road. The " Regulo "-controlled cooker and the thermostatic control of water heating appliances leave very little to be desired.

As regards the maintenance of a constant gas composition, the continuous vertical retort has great advantages compared with other types of plant in which mixtures are made of gases, generally of widely differing calorific values, made in two differing types of plant.

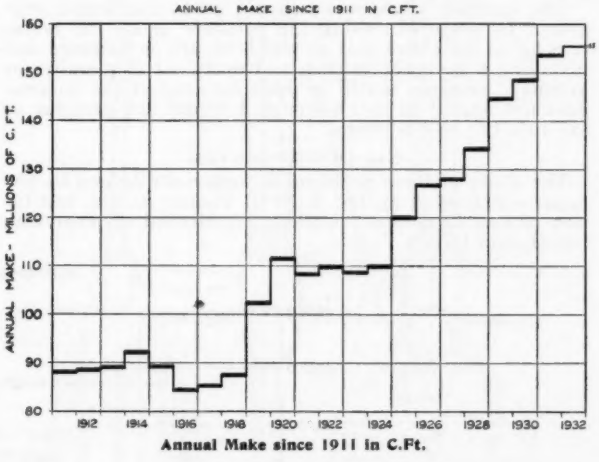
The maintenance of a constant specific gravity is of supreme importance in keeping contented customers. The following figures taken from the text-book " Technical Data on Fuel " show how widely the specific gravities of different gases vary :

| | | Sp.Gr. |
|---|---|---|
| | Air | 1·00 |
| 540 | Horizontal gas | 0·43 |
| 475 | Continuous vertical gas. | 0·48 |
| 295 | Blue water gas | 0·55 |
| 500 | C.W.G. | 0·63 |
| 132 | Producer gas | 0·90 |

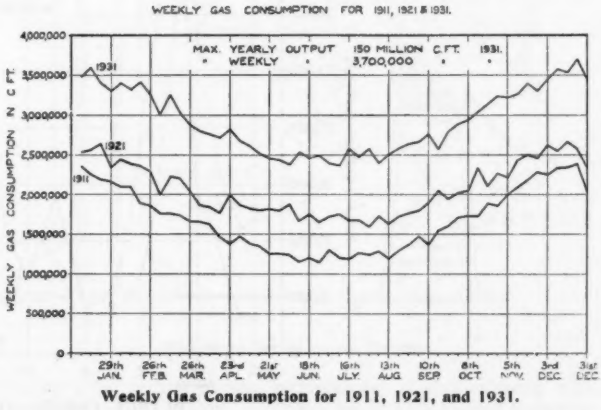
It is at once apparent that varying combinations of these gases to produce a mixture of a given calorific value will result in widely varying specific gravities, with a correspondingly varying set of conditions at the combustion point, as well as varying pressure at the burners unless definite steps are taken to adjust them.

### Variation of Pressure.

Even, however, with plant of such a type as to eliminate this source of inefficiency there remains the problem of variations in pressure at the combustion point, arising out of the distribution of hourly varying quantities of gas




**Annual Make since 1911 in C.Ft.**




**Weekly Gas Consumption for 1911, 1921, and 1931.**

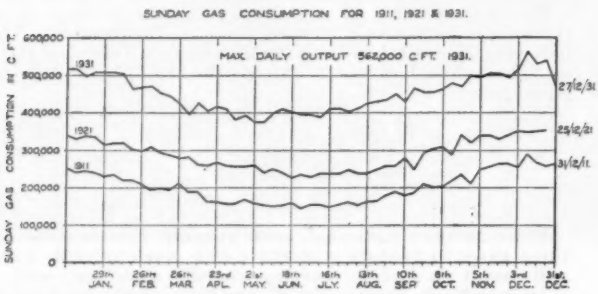
through the mains under a pressure at the works which in the majority of cases is only roughly adjusted to the requirements. That such variations are a source of considerable dissatisfaction to consumers cannot be doubted, and a correspondingly considerable expenditure on mains and apparatus to minimize them is in most cases amply justified.

The problem is most acute in the smaller works, in those districts where the demand has outstripped the capacity of the mains. Costly replacements have consequently to be faced.

The usual resort of putting in a booster, raising the pressure thrown by the holders by 3 in. or 4 in., and boosting during the time of peak loads is not by any means an ideal arrangement.

Such increased pressure is largely absorbed by the consumers near the works, with very slight advantage to those at the far end of the mains, where the supply is the most unsatisfactory.

The progressive policy of improvement in the capacity and, above all, in the arrangement of mains in the district is strongly to be recommended. Very often, particularly in the older districts, mains have been allowed to "grow" by hand to mouth extensions without any definite plan.




**Sunday Gas Consumption for 1911, 1921, and 1931.**

Instead of which, mains should be extended with a view to obtaining a regular system of ring mains with feeders of approximately equal length to ensure even distribution of pressure.

Such ring mains can in time become high-pressure mains feeding into the low-pressure system through district governors.

The question whether we should go to the length suggested by some of raising the pressure in all the mains to a figure far above that to which we are accustomed and installing a governor to each and every set of premises or groups of premises is still an open one, and at the moment does not appeal to me, although I would not presume to say that the idea is wrong.

### Gas Output Curves.

The study of these problems is materially helped by the paper contributed by Dr. J. S. G. Thomas to the Institution of Gas Engineers, entitled "A Method of Analyzing Gas Output Curves."

It would be to the advantage of every undertaking to prepare such curves for its guidance. In the Bridgwater Undertaking,—

| | |
|---|---|
| Our yearly output is | 155 millions |
| ,, maximum weekly output is | 3,750,000 c.ft. |
| ,, ,, daily ,, ,, | 562,000 ,, |
| ,, ,, hourly ,, ,, | 85,000 ,, |

while for half-an-hour on Sundays our rate of output exceeds 92,000 c.ft. per hour. It is this odd half an hour which causes more trouble with us than the rest of the 167½ hours per week, and I suspect that many of our members are afflicted by the same problems. Curves of output, &c., are given for the Bridgwater Works.

### Bridgwater Carbonizing Plant.

As indicated earlier, I consider that continuous vertical retorts go a very long way towards producing gas of a constant calorific value and uniform constitution.

At Bridgwater, Glover-West retorts were installed in 1913, and since then (with the exception of C.W.G. in time of emergency) the whole of our gas has been made on this plant.

When this plant was first set into operation the gas made was 500 B.Th.U., but the calorific value was more or less gradually reduced to 450 until the Gas Regulation Act came into force, when this figure was adopted as a declared value.

The first installation consisted of 20 tapered retorts, each 27 in. by 10 in. by 25 ft. high in two beds of 8 and one of 4.

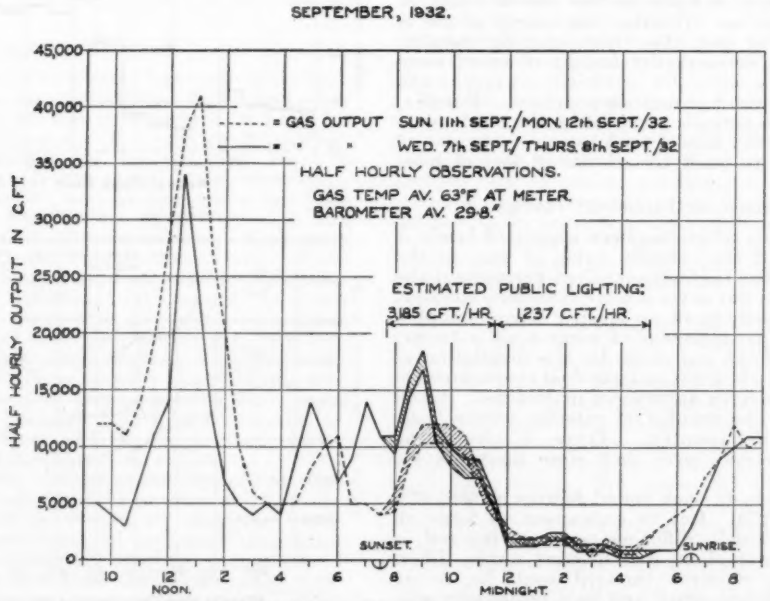
Over the period September, 1913, to November, 1926, 1300 million c.ft. of gas was made from 94,742 tons of coal, or an average of 13,710 c.ft. per ton. The first section of eight retorts was reconstructed on the new model, 33 in. by 10 in. by 25 ft. high, with the steaming chamber at the base, in 1926, and the reconstruction of the last section of four retorts has just been completed. These reconstructed retorts are all built with silica blocks.

From the period of November, 1926, to December, 1931, 726,839,000 c.ft. of gas has been made from 39,723 tons of coal, or an average of 18,300 c.ft. of gas at slightly above 450 B.Th.U. per ton of coal, say, 455—*i.e.*, 83 therms per ton. The coals used have been chiefly Derbyshire, Forest of Dean, and South Yorkshire in about equal quantities. At the present time our average make is about 67,000 c.ft. per mouthpiece, so that a bed of eight retorts will maintain our requirements for at least nine months of the year. The adoption of the new retorts has increased the manufacturing capacity of the plant by at least 2½ times.

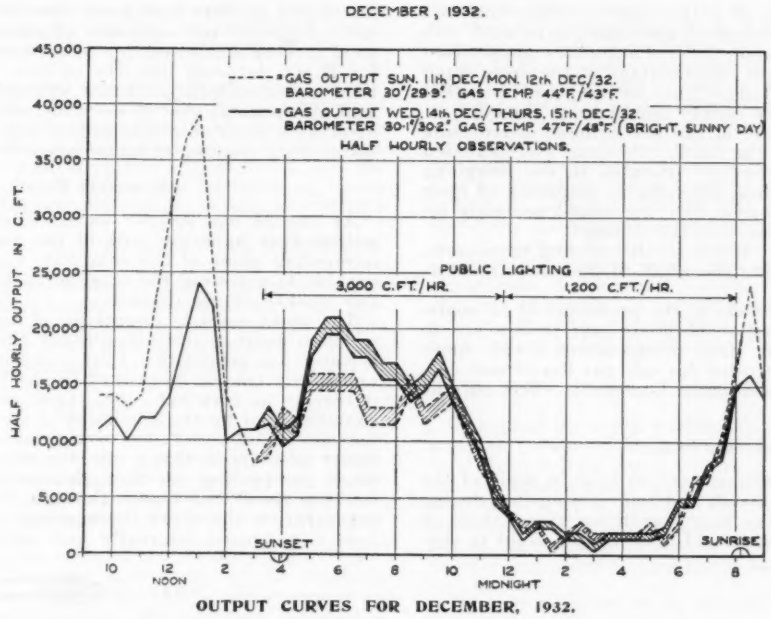
The use of silica blocks in the construction of the retorts has permitted of higher temperatures being used in the settings, and this probably has somewhat reduced their working life in terms of days. After a time spalling has appeared in certain vulnerable portions of the retorts, and as this interferes with the regular travel of the coal, especially after scurfing, a means of rectifying such trouble if it occurs is a very valuable aid to the longevity of the retorts.

### Patching Machine.

For dealing with the difficulty of spalling and small leaks a very useful machine has been introduced which is used while the retorts are under heat. It consists of two parts, (1) a rotary air compressor, power driven (in our case a small Petter oil engine being the motive power), and (2) a water-cooled pipe for conveying liquid tamac to the damaged parts of the retort. At its bottom end this pipe is fitted with a suitable spraying nozzle. Small quantities of tamac are fed into the central pipe, and with an arrange-




**OUTPUT CURVES FOR SEPTEMBER, 1932.**




OUTPUT CURVES FOR DECEMBER, 1932.

ment of cocks the air pressure is admitted thereto after the pipes have been lowered to the position of the damage.

By this means small quantities of tamac are forced into the damaged parts, and this is allowed to bake on for twelve hours. The machine is also very useful for spraying the bottom chambers, and it is our custom to do this after every retort is scurfed, before it is again put to work. The same apparatus is also used externally on the retorts through the various combustion chambers and has proved of considerable value in stopping any small gas leaks which may occur.

Personally I think there is plenty of room for research to find the best composition for the silica material used for high-temperature work, and, having found this material, to maintain it constant in quality. I am rather of opinion that the ideal has yet to be found and manufactured, and unless a better material is forthcoming the use of continuous verticals will be very much prejudiced.

Another aspect of gas manufacture on continuous vertical retorts which appeals especially to the smaller works is the regularity of the make in volume per unit of time. This has a marked effect on the efficiency of plant and processes through which the gas passes on its way to the holders.

The sudden rush of gas which accompanies the charging of a batch of horizontal retorts, with the possibilities of trouble of which we all have had unwelcome experience, is entirely absent.

To summarize, constant quality and constant quantity are leading advantages of the continuous vertical retort.

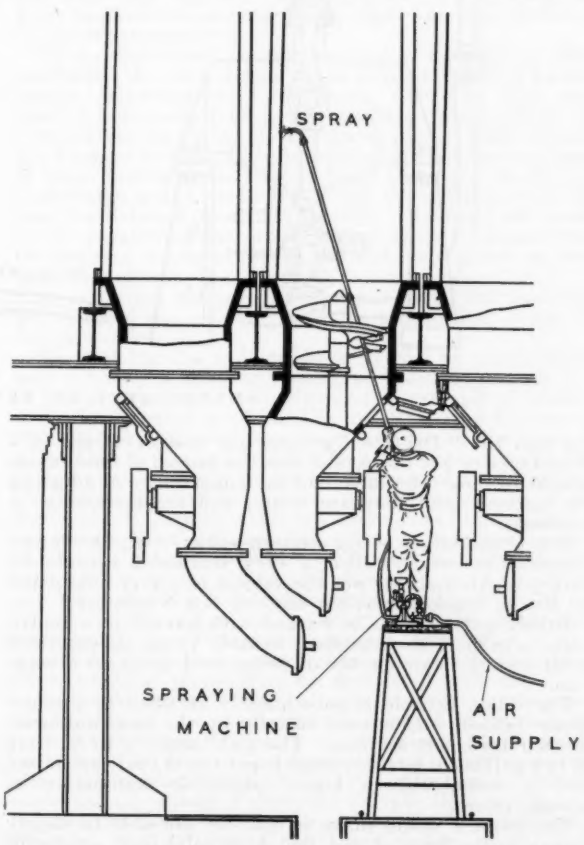
Another great and well-known advantage is flexibility; and while it is true that it is desirable to make a judicious selection of coals, having regard to ease of working and quality of coke produced, &c., yet any coals will give maximum results in the plant compared with other systems of carbonization.

## Coke.

The coke produced for sale per ton of coal used on steamed verticals is, as would be expected, considerably less than where horizontal retorts are employed. In our own case, our coke for sale averages about 7·2 cwt. per ton of coal carbonized, and this is readily absorbed in our own gas area. Indeed, some 400 to 500 tons of coke per annum have had to be purchased from neighbouring undertakings to supply our local demands. We have always encouraged the use of coke for domestic purposes, and, realizing that a comparatively ash-free coke graded to size was wanted, we have endeavoured to satisfy our customers by first selecting our coals with low ash content, and, secondly, grading to size required.

We use a Cort's rotary screen and breaker driven by a Marshall steam engine and supply three sizes of coke at a charge of 1d. per cwt. above the ordinary price of coke in yard. Since the installation of this machine, which gives excellent results, fully 60% of our coke sales have been of the graded class.

Our chief customers for domestic coke are at present those who have kitchen boilers of the "Ideal" type, but we think that the use of gas coke in open or semi-open fires is worthy of encouragement. There are on the market some attractive open fires of the well-grate type with gas ignition and a number of these have been installed in Bridgwater. If they can be popularized they would create an excellent market for clean, well-graded coke. The cultivation of the domestic demand for coke is particularly well worth while, if only because it reaches a peak coincident with maximum production. Coke for the kitchener has




Operating the Spraying Machine.

many good selling points, particularly if also coupled with gas ignition. Combustion takes place at a higher temperature than that of coal so that water in a back-of-fire boiler is more rapidly heated. The higher temperature also gives a more effective radiation into the kitchen for drying clothes and warming generally. Another attractive feature is the absence of soot in the flues. Every housewife will appreciate, if brought home to her, the removal of the filthy job of cleaning flues from the weekly duties in the

kitchen. There is need of a thorough investigation into the modification of the design of kitcheners to be used with coke. The provision of some form of automatic hopper feed would overcome the slight disadvantage of the more rapid consumption of a given bulk of coke as compared with that of coal, and some simple means should be devised for removing ash from the base of the fire without distributing dust in the kitchen. If the market for coke was increased by some such development as indicated in the foregoing remarks, instead of finding difficulty in disposing of their production, as so many now do, they would probably instead have difficulty in meeting the demand.

We also give generous terms to all our coal merchants, conditional on their taking the whole of their requirements of coke from us.

The efforts to utilize breeze in the producers of carbonizing plants and the adoption of waste-heat boilers are to be welcomed because by these means about 3 cwt. more of high-grade coke is liberated for sale per ton of coal carbonized, with a correspondingly favourable effect on the selling price of gas.

### New Processes.

Several interesting processes are on trial in some of the works in the West of England, and I am hoping that during my year of office we may hear something about these at one or other of our meetings. I believe I am right in saying that the " Dri-Gas " process was first developed in a West Country gas-works, and this has proved of inestimable benefit to those who have had the opportunity of adopting the process—and they are many, and are increasing in numbers.

One of the larger of our western works—viz., Devonport Corporation—has installed a very successful benzole recovery plant, and this was the subject of a very able paper by Mr. F. Blackburn at our meeting last November.

Briefly put, the gas is washed with gas oil in a centrifugal scrubber, the absorbed benzole being subsequently recovered by steaming, the oil being used again for absorption.

The crude benzole is subsequently rectified to produce motor benzole and is used entirely by the local authority in their transport services. The yield appears to be from $2\frac{1}{2}$ to 3 gallons of rectified benzole per ton of coal carbonized and is undoubtedly a highly profitable transaction at present prices.

The point I would make is that we are able to supply energy in the form of gas, liquid, or solid fuel, whichever is the most profitable, and according to the state of the market prices.

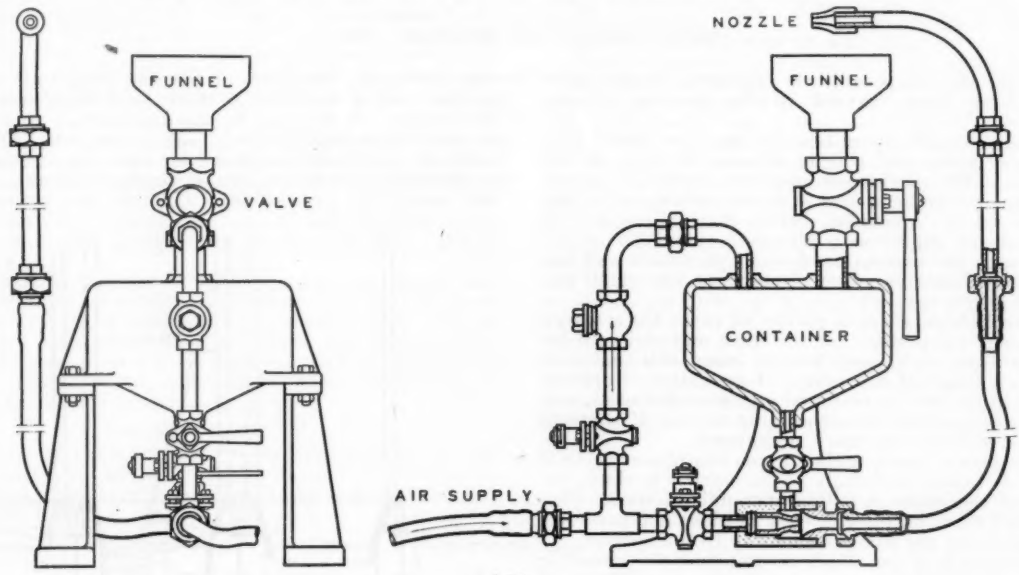
At the present price of benzole the value of the therm in the liquid state is double its value as gas; moreover, washing for benzole entirely eliminates naphthalene from the gas.

Another process which is being tried out at works of about 250 millions per year capacity and has met with a considerable measure of success is the neutralization of the ammonia contained in the liquor produced during carbonization by the acid flue gases arising from the regenerators and which hitherto have been allowed to pass up the chimney. Sulphate and carbonate of ammonia are produced of good merchantable quality and colour, without any cost for $H_2SO_4$ entering into the picture. If S/ammonia can thus be successfully produced without any heavy cost for acid, it is possible that its manufacture may again be looked upon as a profitable transaction and the problem of the satisfactory disposal of liquor also solved.

### New Gas Plant.

At one of our smaller works (annual make about 50 millions) we have the bulk of the gas being made on an interesting plant of the complete gasification type, but capable of arresting the stage of carbonization to produce any quality of gas desired.

The plant consists essentially of an outer steel shell in which is built a vertical coal-gas retort superimposed on a water gas generator. Coal is fed into the top champer and slowly travels downward to the W.G. chamber, which it reaches as very hot coke. Coal gas is made in the top chamber, and by the admission of steam, water gas in the bottom chamber. Prior to the admission of steam, air under pressure is blown into the coke, the resultant producer gas passing out through nostrils at the base of the coal-gas retort and thence through the series of chequered regenerative chambers surrounding the retort. All the heat is produced internally and with extremely low fuel losses. Any quality of coke can be produced in the plant by suitable admixture of coal; moreover, by prolonging or diminishing the rate of extraction, any quantity of coke may be gasified, thus exercising control over quality of gas produced and quantity of coke for sale. The plant appears to be very flexible and has given excellent financial results during a period of three years it has been continuously working. The works in question are producing about 95 therms per ton of coal, 450 B.Th.U., together with 4 cwt. of coke and 9 gallons of tar, which are very excellent results indeed for so small a works. On a trial run with a new plant just erected, 150 therms of gas per ton have been produced, according to reported tests. Having no doubt that you will hear something more about this plant in due course, I refrain from further particulars.




ARRANGEMENT OF RETORT SPRAYING MACHINE

### Gasholder Report.

There has been prominently brought to our notice by the admirable report of the Sub-Committee of the Institution of Gas Engineers the question of the inspection and insurance of gasholders. Therein are given leading points which are well worth following by every undertaking, both large and small. Whether or not an outsider should be called in at stated regular periods to examine and report on each holder will depend very largely on the confidence one has in one's own staff to carry out this work efficiently. Insurance with examination, as in the case of boilers, is certainly an attractive proposition, but most of the insurance companies' proposals which I have had before me suggest that the companies in question appear to have a very exaggerated idea of the risk they are asked to shoulder. If the proposals of the Institution Committee are adopted,

and sedulously carried out, the risk of accident and failure would, I think, be almost negligible, and, therefore, insurance at the rates at present being quoted hardly worth while.

The foregoing paragraph was written before we had the report of the shocking accident in the Saar Valley, Germany. I am sure we all sympathize most sincerely with all the sufferers in this deplorable disaster. The holder was of the waterless type, 4¼ million c.ft. capacity, and the accident appears to have arisen from an external cause, and not due to any inherent fault in the design or structure of the holder itself.

This was reported to be working perfectly immediately before the occurrence.

It behoves us to do all that is humanly possible to prevent accidents, and thus preserve the good name which gasholders have had in the past, and to restore public confidence, which gets rudely shaken by newspaper reports—too often grossly exaggerated and very alarming to the public who do not understand.

### Labour.

I think we may congratulate ourselves on the complete absence of labour troubles in the Gas Industry, and in this connection great praise must be given to the work of the Federation of Gas Employers, without which organization I believe we should have a very different state of affairs at the present time.

I am also a strong advocate of the claims of co-partnership as a means of satisfying and steadying the demands of our employees—especially when this is accompanied by some equitable pension scheme. My Company adopted a co-partnership scheme in 1911. From time to time this, through changing circumstances, had to be altered somewhat, and it is now fundamentally based on the scheme originally put forward by that far-sighted pioneer the late Sir George Livesey, whereby a bonus on wages, depending on the price of gas, is paid to the workpeople. The scale fixed is the same as our scale of prices to customers, which regulates dividends—*i.e.*, every 1d. per therm carrying a rise or fall in the bonus of $\frac{5}{8}\%$, $\frac{1}{16}$ of a penny per therm carrying $\frac{1}{16}\%$ rise or fall. The bonus at present stands at $8\frac{5}{16}\%$. The bonus is declared half-yearly, that declared in June must be invested in the Company's ordinary stock, at market price, that declared in December may be withdrawn. The employees in the scheme number 38, and hold £3500 of the Company's stock. Since the scheme was inaugurated the employees have benefited to the extent of £9000.

To this, in 1927, was added a generous pension scheme, whereby the employees contribute 3% or 4% of their wages, according to the age at entry, and to which the Company adds a similar amount. The employee, on retirement, is entitled to 1/60th of his wages as pension for every year of service with the Company, up to 40/60ths, or two-thirds, which is the maximum pension payable under the rules of the scheme. The employee must retire at 65 and claim pension. The bonus and pension scheme applies equally to staff and workpeople. I have no hesitation at all in saying that the co-partnership and pension schemes we have adopted have, in our case, been very much appreciated and given great satisfaction, and have tended to honest and loyal work on the part of our staff and workpeople. The value of a loyal and contented body of workpeople cannot, I think, be expressed in £ s. d. Therefore I have no hesitation in recommending a similar scheme to those who have not as yet adopted profit sharing as part of their policy.

### Sales Policy.

This address appears to me to be rather prolonged, but one cannot meet a body of gas administrators in these days without the question of sales and methods of charge arising. Although we have not as yet made any startling innovation in the matter or methods of charge—still retaining the old method of giving increasing discount for consumption, varying from 2½% to 15%, this being in accord with our old Act of Parliament—yet I am strongly impressed with the block system of charging, especially when accompanied with the adoption of a smaller unit than the therm.

At present I favour the 4000 unit as being the more easily adaptable. The fact of its being 1/25th of a therm, simplifies the keeping of accounts, so long as gas continues to be measured in cubic feet.

Such unit will sell at something less than ½d. in most places. I believe the block system of charging will be a business getter and will tend to the end which we all so much desire—viz., the increasing of the consumption of gas by existing customers. Therein, I am convinced, lies our future success and increases, and the system will I think be largely adopted in the near future.

### Census.

We have recently taken a census of all our customers, and although the same has not, as yet, been fully collated we have learnt enough to know that our service methods can be very greatly improved, with advantage to our customers and also to ourselves.

If any of my listeners have not as yet taken a census of their district I would strongly recommend them to do so, if they would like to see themselves as others see them.

Nothing militates against the further development and expansion of the Gas Industry more than the obsolete and restrictive character of much of the legislation under which Gas Undertakings have to operate to-day. Not only does it hamper us in the struggle with our competitors, who are free from the legislative disabilities from which we suffer, but it hinders us in the occupation of fields, other than the purely domestic, which hold out such great prospects of expansion. Indeed, but for the fact that for well over a century we have been habituated to circumventing difficulties in our path, our position as an Industry would have been infinitely less satisfactory than it is to-day.

### Legislation.

The need for some modification of laws passed in 1847 and 1871, long realized, became acute as the result of the conditions arising out of the war, and it was also seen that united action through a national body was essential if that need was to be satisfied. Hence the formation of the National Gas Council, followed soon afterwards by the passing of the Gas Regulation Act of 1920. That Act has been described as a great Charter of Liberty for the Gas Industry, and so it is.

Its operation, however, at once threw into higher relief the obsolete nature of the early legislation which remained in force, and the National Gas Council on behalf of the Industry began a struggle for reform which it has waged persistently and strenuously ever since.

The results at first sight may scarcely seem commensurate with the effort expended, but when we remember that legislation along the lines required presents no attractive features from an electioneering point of view, it is perhaps not surprising that such legislation has had to be wrung from successive Governments in what has been described as halfpenny numbers.

On the other hand, but for the unrelenting pressure which resulted in the examination of the Industry's claims by successive Departmental Committees, which in each case made a favourable report, the legislation which has so far been passed would not have been secured. There is, too, good reason to hope that the work of the Committee, some of whose findings have already found expression in the Gas Undertakings Act, 1932, and in the Second Report of the Gas Legislation Committee, recently published, will result in the granting of powers to undertakings to depart from the flat-rate system of charge and to have recourse to more modern methods.

In any event the Gas Regulation Acts of 1929 and 1932 are outward and visible signs of a recognition of the Industry's claims.

Nor does the Gas Industry seek its goal by direct attack only. Where a flanking movement promises success it is at once resorted to, and an outstanding example of achievement thus secured is afforded by the Kettering Gas Act of 1932. The Kettering Gas Company, denied the right to supply gas to Council houses which the Council desired to maintain as a close preserve for the sale of the electricity which they themselves produce, sought the advice of the National Gas Council, which not only advised but supported the promotion of a Private Bill. This attempt on the part of a local authority to dictate to its tenants, when brought to the notice of the House of Commons, roused strong resentment, and the Bill which establishes the right of the tenants to choose any form of heat, light, and power they may desire was triumphantly passed, and forms a most powerful precedent for other companies which find themselves similarly placed *vis-a-vis* their local authorities.

Nor is the struggle directed only towards securing new gas legislation. Constant effort is required to prevent the inclusion in other legislation of provisions which might prove harmful to the Gas Industry and in softening the effects of legislation already in force. In this way useful modification, of both Public and Private Bills and Special Orders, has been obtained—*e.g.*, the Town and Country Planning Act, and many Electricity Orders, while, as in the case of the Rating and Valuation Act of 1925, it has been possible to secure more equitable application of the law which would otherwise have borne hardly upon Gas Undertakings.

While, therefore, we naturally chafe at the delay in securing the right to conduct our undertakings on lines more closely approaching those open to other industrial concerns, we must acknowledge that substantial progress towards our goal has already been made. We can take comfort, too, from the fact that our action, aided by existing economic and industrial conditions, and by gradual

recognition of the fact that gas can play a most important part in the "Back to Coal Movement" by transforming coal into gas for industrial purposes, and so enabling oil—an imported product—to be dispensed with, is undoubtedly opening the eyes of the public and of Parliament to the urgent need for releasing us from obsolete restrictions.

When, therefore, it is suggested to us from time to time that we should flout the legislative authority under which we live, move, and have our being, I think we should move carefully. It behoves us to remember that such action would not only render us liable to the most drastic pains and penalties, but would seriously jeopardize a movement which has already borne good fruit and appears now to be on the point of bringing it forth in greater abundance.

### Efficiency.

There is no reason to doubt that the Gas Industry holds the key to the most efficient and economical method of applying our coal resources to the problems of light, heat, and power with which our country is faced, but we must keep watch all around while we wait for the rising tide, which often has a knack of coming in behind us unseen. A wise expenditure in preparing to meet the expansion which will inevitably follow the revival of trade is strongly to be recommended. It will be well if we all adopt the advice which is implied in Mr. Blundell's phrase: "A definite policy that no reasonable opportunity must be lost of staking out the claim for gas, for every domestic and industrial purpose within the area covered by our several undertakings." Someone has said that "If we would swim for life we must kick ourselves free from the waterlogged garments of mere respectability." This to my mind admirably portrays the position of the Gas Industry to-day.

Gentlemen, in conclusion I apologize to you for the length and rambling nature of this address. If I have been able to provide some thoughts upon the many problems with which we are at present surrounded, upon which you can reflect, I shall be quite gratified. I am rather relieved that it is not customary in this Association to discuss openly or criticize your President's address, but have little doubt that this will occur in front of many cosy gas fires, and heart-to-heart discussions with one's colleagues.

I sincerely thank you for the patient reception you have accorded to me.

# Observations on the Distribution of Ash in Coal and Coke*

By Arthur Marsden, F.I.C., M.I.Chem.E., F.Inst.F., M.Inst.Gas E., of Bristol (Past-President of the Western Junior Gas Association)

At the urgent request of our President I consented, a week ago, to prepare a few notes for this meeting. When I had the pleasure of addressing the Association in March, 1927, it was to take the place of a paper which could not be read; and similar conditions obtain to-day. If, therefore, my subject appears to be treated in too elementary a manner, or you should conclude that the information appears incomplete, I must crave your indulgence because I too feel that the work has not been carried sufficiently far for presentation. However, some interesting facts have already emerged, and I can only hope my observations will not be without interest.

It is convenient to commence by considering the chief impurities to be found in coal; these are shown in Table 1, which is self-explanatory.

Table 1.—*Classification of Impurities in Coal.*[1]

| | | | |
|---|---|---|---|
| Water | Free | | |
| | Inherent | | |
| | Chemically combined | | |
| Ash | Plant ash | | |
| | Rocks | Shale | |
| | | Clay | |
| | | Slate | |
| | | Sandstone | |
| | | Limestone | |
| | Minerals | Calcite | $CaCO_3$ |
| | | Gypsum | $CaSO_4 . 2H_2O$ |
| | | Pyrites | $FeS_2$ |
| | | Marcasite | $FeS_2$ |
| | | Halite | NaCl |
| | | Evansite | $Al_6P_2O_{14}\ 18H_4O$ |
| | Sulphur | Pyrite | |
| | | Marcasite | |
| | | Gypsum | |
| | | Organic compounds | |
| | Phosphorous | Evansite | |
| | | Organic compounds | |

[1] "Fuel, Gas, Water, and Lubricants," p. 95. Late Prof. Parr

### Mineral Matter in Coal.

Under this heading several points may be considered, including simple definitions relative to ash distribution. When coal is burned, the inorganic substances are left, more or less modified, in the form of "ash." The colour and, as will be seen later, the composition may vary greatly. The ash obtained from coal is always different both qualitatively and quantitatively from the mineral matter from which it is derived. It is profitable to consider how the various ash-forming bodies may be distributed with respect to the coal substance itself, and, therefore, in a general way, to coke made from the coal.

Ash in coal may be classed as (*a*) "Inherent" and (*b*) "Extraneous." (*a*) Inherent, intrinsic, or inseparable ash are names given to ash forming impurities so intimately mixed with the coal that they form an integral part of the coal substance. Such impurities are plant-ash, microscopic particles of clay, and mineral matter. The amount of ash in plants of the types from which coal was produced varies, but is low; during the process of coal foundation, however, the great shrinkage of the mass would cause a corresponding increase in ash. Microscopic study reveals that very fine clay is intimately associated with most coal. This no doubt settled out of the water in which the coal forming plants were laid down. During or after formation mineral precipitates or replacements also took place from water carrying salts in solution. It has been observed[1] that the inherent ash is fairly constant for a given seam and, in bituminous coals, may vary from 3 to 12%. Some coals contain sufficient inherent ash to impart to them a grey colour. From 25-40% of inherent ash gives the so-called "Bone" coal, while, if over 40%, carbonaceous shales result. Time does not permit of more than passing mention, but it should be noted that a seam is rarely, if ever, homogeneous over its whole thickness, and the "banded constituents" constituting the coal substance, as apart from the whole seam which would include dirt-partings, shale bands, and other extraneous ash, are each characterized by ash, the quantity and composition of which are, speaking broadly, characteristic of each banded constituent.

For example:

(1) Clarain and vitrain—*i.e.*, bright coal—contain inherent plant ash, or what remains of it, to the extent of between 1 and 2%. It is largely water soluble.

(2) Durain—dull coal—yields 6-7% ash, mostly clay substance.

(3) Fusain—sometimes called "Mother of Coal" or mineral charcoal—may vary in ash content from 4-30%, which contains much acid soluble salts ($CaCo_3$,$FeCO_3$) derived from infiltration.

Lessing[2] gives the ash percentages from the Thick Seam of Hamstead, S. Staffs., as follows:

| — | Ash % | While Experiments at the Fuel Research Station on a Lancashire Seam gave— |
|---|---|---|
| Fusain | 15·6 | 9·6 |
| Durain | 6·3 | 4·6 |
| Clarain | 1·2 | 3·5 |
| Vitrain | 1·1 | 0·6 |

It should be noted that, generally, small coal contains a higher proportion of fusain, which has little or no caking power.

(*b*) Extraneous or separable ash consists of bands, layers,

Paper before the Western Junior Gas Association. Meeting at Bath, March 11, 1933.

[1] Morgan. Amer. Gas Practice, 1931, p. 105.

[2] Royal Society Arts. Cantor Lectures, 1925, p. 8.

balls, and veins of mineral matter which are separate and distinct from the coal, although this fact is not always obvious upon casual inspection. If the influx of fine clay or silt referred to under inherent ash was greatly increased, as, for example, during times of flood, then separate bands of rocks, such as clay, shale, and even sandstone were formed. Another source of ash is the clay and shale forced into cracks by pressure, giving the so-called " clay veins " and " mud slips." Percolating waters are responsible for sulphide of iron ($FeS_2$) in the forms of pyrites and marcasite, for sulphate of lime ($CaSO_4.2H_2O$), and for various concretions and laminae of the carbonates of iron, lime, and magnesia.

Finally, as a source of ash, there is contamination by particles of roof and floor of the seam during mining operations.

A few notes on the mineral concretions known as " coal-balls " may be of interest. Certain coal seams, of varying geological age, contain nodules which vary in size from a pea to several feet in diameter, and there are three chief kinds known respectively as " floor," " seam," and " roof " nodules. The chief horizon in Great Britain is the upper foot coal of Lancashire. [The specimens shown, which were cut and polished, were obtained from Upper Foot and Union Mines, Sharneyford, Bacup, Lancs.] Such nodules consist essentially of the carbonates of calcium and magmesium, although mud and clay occur to the extent of about 10% in floor and roof specimens. Sections of seam nodules show them to consist of petrified plant remains, the petrifying solution being obtained from sea or brackish water.

The chief information to be gathered from " coal-balls " may be summarized as follows[1]: (1) The vegetation which formed the coal seam in question consisted mainly of swamp plants which grew *in situ*. (2) The remains of vegetation found in the roofs of seams may show important differences from the vegetation which went to form the seam itself. In the case of the Upper Foot Seam of Lancashire the roof contains the remains of land plants. (3) The conditions under which the plants grew can be deduced from their structure. The coal forming forests were on swamps, and the water contained either salts or organic acids. (4) The absence of growth rings from the wood of the stems suggests a uniform climate, probably temperate.

## Ash Distribution and Coal Cleaning Processes.

It is not proposed to deal in any detail with the various coal cleaning processes, but to make general observations appropriate to our subject. In this connection it is well to remind ourselves of two cardinal points: (*a*) That mineral matter in coal serves no useful purpose from the point of view of the user, and is generally a source of trouble, loss, and extra cost. (*b*) That if coal be cleaned at the pit-head, which, of course, is the proper place, because there the plant can be adjusted to optimum conditions suitable for the particular type of coal, transport and handling charges are reduced. It is worth while quoting the well-known calculation of Lessing[2], who states that, taking the annual coal production in this country as 250 million tons, 10% of it, or 25 million tons, represents the incombustible material. Taking the average haulage distance by rail of coal to be 43 miles and the cost one penny per ton mile, then about £4,500,000 per annum is spent on hauling this waste material. He further estimates the total non-productive expenditure arising from ash in coal to be between £10,000,000 and £20,000,000. The extraneous mineral matter, being less intimately associated with the coal substance than the intrinsic ash, is capable of being partly removed by cleaning processes, and while such processes were introduced primarily to yield coal suitable for oven coking, the pressure brought to bear by the Gas Industry, particularly since the war and largely as a result of economic difficulties, has resulted in a considerable extension of coal-cleaning plants. It is only fair to state that this is also due in part to an endeavour by the mining industry to provide a material more suited to the purpose in view than used to be the case. Davies calculates that about 80% of the total coal raised in this country undergoes some form of purification or grading.

The preparation of coal may be considered to fall into four sections:

A. Separation of types of coal, or of dirt or shale from coal—as, for example, by picking belts.
B. Grading or screening into different sizes.
C. Washing or cleaning to reduce ash content.
D. Blending of coals from different seams.

[1] For further particulars and very fine specimens, see collection in the Museum of Prac. Geology, Jermyn Street, London.

[2] Royal Society Arts. Cantor Lecture, November, 1925.

The progress of coal cleaning in Great Britain is shown by the following figures[1]:

| — | 1927. | 1928. | 1929. |
|---|---|---|---|
| Washery plants | 500 | 545 | 560 |
| Dry cleaning plants | 27 | 55 | 75 |
| Froth flotation plants | 19 | 8 | 8 |
| Coal washed or cleaned (thousands of tons) | 51,440 | 60,326 | 71,331 |
| In washeries | 49,054 | 57,363 | 65,871 |
| ,, dry cleaning plants | 1,414 | 2,774 | 5,323 |
| ,, froth flotation plants | 932 | 189 | 136 |
| % of total output | 20·5 | 25·4 | 27·6 |

## Relationship Between Ash Distribution and Coal Cleaning Processes.

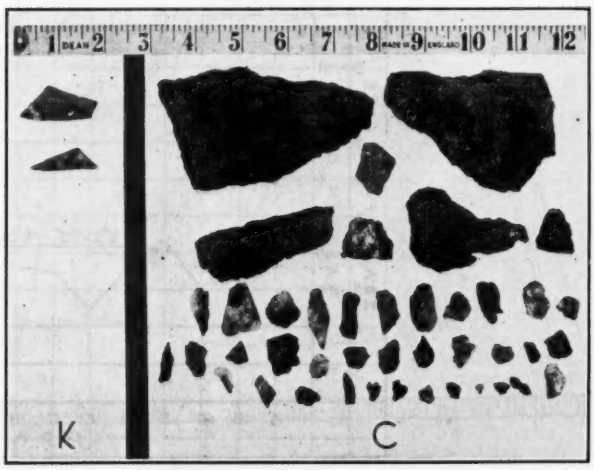
This deserves an entire paper (to those interested attention may be directed to the various investigations of the U.S. Bureau of Mines[2]). The principal favourable effect of washing coal is the improvement in the quality of the coke. Washing or dry cleaning reduces the percentage of ash by eliminating free impurities such as shale, slate, and pyrites. Even in such cases, however, numerous pieces of shale pass through with the coal fraction; this is particularly noticeable where the shale particles are flat and thin, because they are apt to take a zig-zag path and sink slowly, a fact well known to all who have carried out washing tests on coal.

Another interesting and important point is that one sometimes finds the ash in a " cleaned " coal to be higher than would be expected, although the cleaning plant may be operating satisfactorily. This may be due to the nature and distribution of extraneous ash; take, for example, the following scale in Table 2:

Table 2.—*Effect of " Cleaning " on Ash Content of Coals.*

| Coal. | Method of Cleaning. | Before Cleaning. | | After Cleaning. | | % Reduction in Ash. | Remarks. |
|---|---|---|---|---|---|---|---|
| | | % Average Ash. | No. of Tests. | % Average Ash. | No. of Tests. | | |
| K | Washing | 15·6 | 49 | 10·0 | 56 | 35·9 | Each test represents one truck |
| M | Washing | 7·5 | 30 | 4·0 | 11 | 46·6 | |
| C | Dry cleaning | 11·6 | 73 | 10·0 | 27 | 13·8 | |
| C1 | Dry cleaning | 11·3 | 49 | 10·0 | 27 | 11·5 | |

In the case of " C " the coal is picked and screened; the small coal is cleaned and then mixed with the large. The ash reduction is low, and this is due to the presence of bands of stone and shale which run, sometimes right through the pieces of large coal. An average sample of this coal was submitted to the Brazier Test, to be described presently, and the pieces of " bat " or stone corresponded with the large pieces of coal and only to a small extent with the small or cleaned coal.



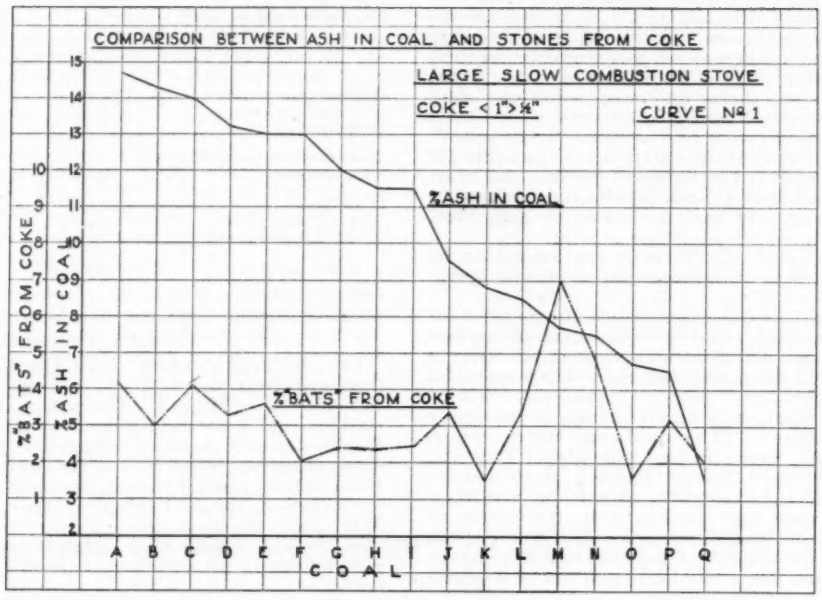

**Showing the "Bats" from 20 lbs. each of Coals K and C (Table 2).**

## Ash Fusibility and Clinker Formation.

Chemically, the ash from coal and coke consists principally of silica and alumina from the shale and clayey

[1] " Modern Coal Cleaning Plant " (North), p. 3.

[2] See also " Fue in Science and Practice," Vol. IX., No. 11, p. 533.


COMPARISON BETWEEN ASH IN COAL AND STONES FROM COKE
LARGE SLOW COMBUSTION STOVE
COKE < 1"> ½"
CURVE Nº 1
%ASH IN COAL
%"BATS" FROM COKE
% ASH IN COAL
% "BATS" FROM COKE
A B C D E F G H I J K L M N O P Q
COAL

matter. The remainder is iron oxide, very frequently produced from iron sulphide, together with CaO, MgO, $Na_2O$, and $K_2O$. The alkalis come essentially from the original woody material and, to a less extent, from salt water.

Both the amount and nature of the ash have an important bearing upon the commercial value of a coal or coke, and the table[1] shows how widely the proportion of oxides, silicates, and sulphates may vary:

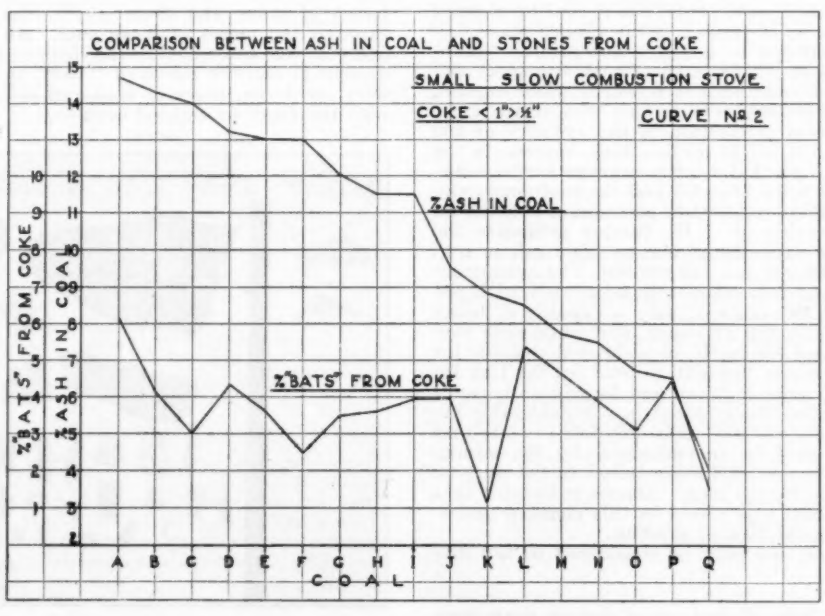
TABLE 3.

| — | — | % Weight. |
|---|---|---|
| Silica | $SiO_2$ | 25–50 |
| Alumina | $Al_2O_3$ | 20–40 |
| Iron oxide | $Fe_2O_3$ | 0–30 |
| Magnesium oxide | MgO | 1–5 |
| Calcium oxide | CaO | 2–10 |
| Titanium oxide | $TiO_2$ | 0–3 |
| Alkalis | $Na_2O + K_2O$ | 1–6 |
| Sulphates | $SO_3$ | 1–12 |

It is very difficult to connect the chemical composition of ash with its melting-point, but, generally, the closer the composition approximates to $Al_2O_3.2SiO_2$, and the lower the iron content, the more refractory the ash. Cleaning not only lowers the percentage of ash and sulphur in coal, and consequently in the coke made from the cleaned coal, but it also reduces the amount of clinker produced. In the unwashed coal, pieces of slate and shale get stuck together by some of the more fusible constituents of the ash, thus increasing the amount of large clinker.

Fusibility of ash is very important and may vary from 1000° C., or even less, to 1650° C. Low fusibility is due to large amount of $Fe_2O_3$ and alkalis and, to a lesser extent, to lime. As is well known, iron oxide, particularly under reducing conditions, is intimately associated with clinker troubles. Strictly speaking, it is incorrect to refer to the melting point of an ash, because in practically every case there is a fusion range of varying magnitude over which the reactions take place, and softening curves are very useful for showing whether the ash fuses fairly rapidly to a molten glass, whether there is slow uniform softening, or whether there is a partial melting followed by a longer or shorter pause before final and rapid melting. Such curves may throw some light on "combustibility" and "reactivity" of coke. Rose[1] (of the Koppers Company, U.S.A.) has shown that the softening temperature of a coke ash is practically the same as that of the ash in the coal from which the coke is made.

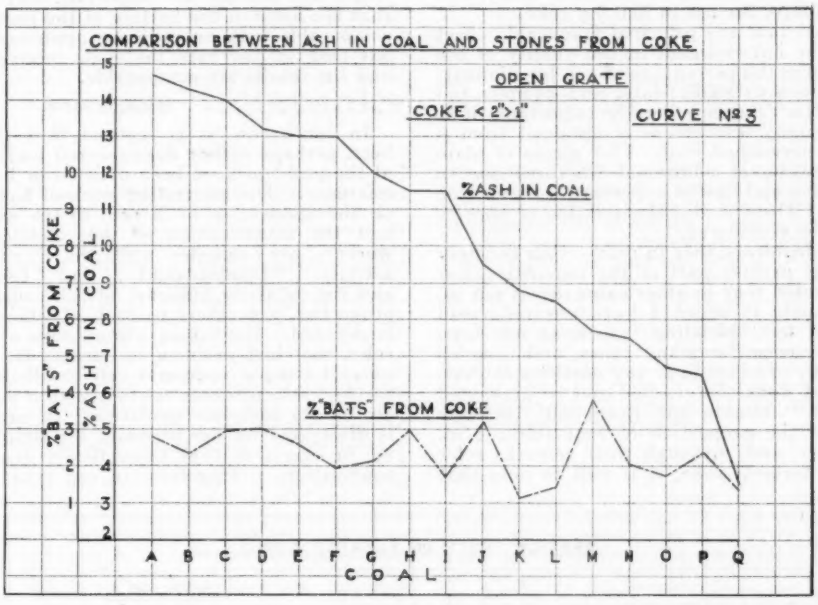
As an indication of the value of knowledge concerning ash one may refer to a paper by Sinnatt and Wood[2], where is pointed out the possibility, in certain cases, of excessive


COMPARISON BETWEEN ASH IN COAL AND STONES FROM COKE
SMALL SLOW COMBUSTION STOVE
COKE < 1"> ½"
CURVE Nº 2
%ASH IN COAL
%"BATS" FROM COKE
% ASH IN COAL
% "BATS" FROM COKE
A B C D E F G H I J K L M N O P Q
COAL

[1] North, p. 23.

[1] "Chem. and Met. Eng.," Vol. 25, p. 141, 1921.

[2] Trans. Inst. Min. Engs., 66, 3–4, 1923.


COMPARISON BETWEEN ASH IN COAL AND STONES FROM COKE
OPEN GRATE
COKE < 2">1"
CURVE Nº 3
%ASH IN COAL
%"BATS" FROM COKE
%"BATS" FROM COKE
%ASH IN COAL
COAL
A B C D E F G H I J K L M N O P Q

purification of coal producing an ash of low fusion point and thus leading to trouble. Such cases are rare, but worthy of notice.

These general considerations lead to one of the main points I wish to bring to your notice—namely, how, viewed from certain standpoints, the ash percentage in a coal may be misleading or, at any rate, fail to give a complete picture of the possibilities involved. It would appear that in the past, when considering the quality of coke which could be made by high-temperature carbonization from a given coal, great stress has been laid upon the " ash content " of the coal and, in the case of metallurgical coke, the sulphur content, but relatively little attention seems to have been paid to the ash distribution in the coal. It is quite possible, as will be shown, to have a coal with a high ash percentage (say, 12%) which will produce a coke capable of giving better service in domestic appliances such as slow combustion stoves, or even open grates, than another coal containing only half as much ash, or even less. In the first case the ash would be mostly of the inherent type or at any rate distributed fairly uniformly throughout the coal, while in the second much of the ash would be present as lenticles or laminae, thus producing a much larger quantity of " bats."

This is illustrated clearly by the curves (1, 2, and 3) and the specimens. The Bristol Gas Company recently installed a coke grading plant, and both before and since that time routine work has been in progress for the purpose of collecting information relative to the quality of coke produced from various coals. In order to do this, coke made from individual coals in the large coal testing plant was screened, and the behaviour of two sizes $< 2$ in. and $> 1$ in. and $< 1$ in. and $> \frac{1}{2}$ in. observed in slow combustion stoves and an open grate. The same appliances were used throughout the tests, so that the results are comparable. In each test approximately 1 cwt. of coke was consumed and the amount of material passing through the bars and the amount of " bats " and clinker, if any, noted. Only the material left on the bars was classed as " bats "; if any pieces happened to pass through they were not recorded, it being assumed they would also pass through in ordinary practice.

In discussing the three sets of results, several points emerge:

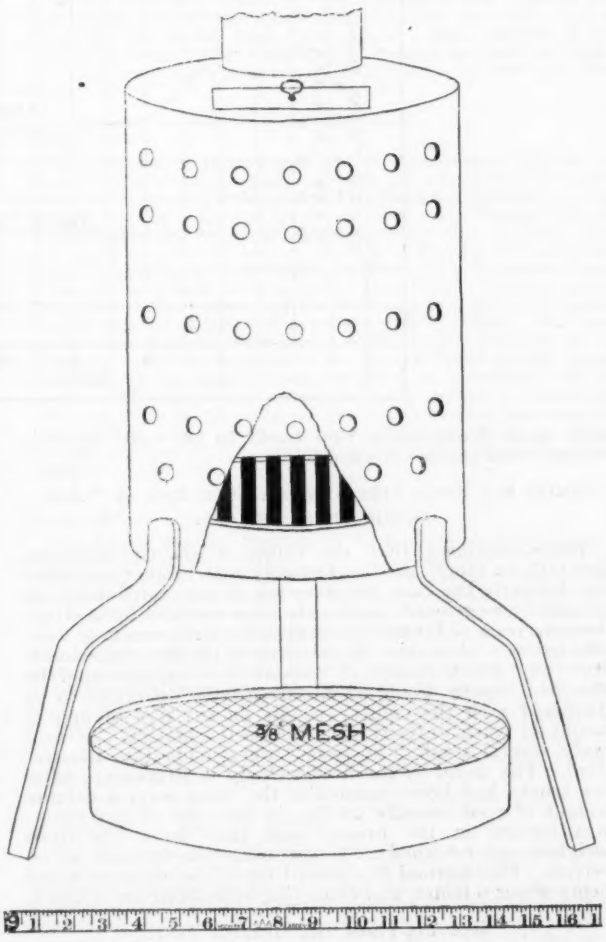
(1) The most important, that the ash percentage in a coal is no guide as to the amount of " bats " it, or coke from it, will yield.

(2) As would be expected when the same size or grade of coke is burned in, say, different capacity slow-combustion stoves, the percentage of " bats " bears relationship to the bar spacing in the stove.

(3) The results from the open grate always show a smaller percentage of " bats " than coke from the same coal burned in a slow-combustion stove.

This may be due to (*a*) different spacing between the bars —in the open grate (Peveril) the bars are parallel from front to back and spaced $\frac{3}{8}$ in. apart, while in the large and small (slow-combustion) stoves the spaces are $\frac{1}{2}$ in. to $\frac{3}{8}$ in. and $\frac{3}{8}$ in. to $\frac{1}{4}$ in. respectively—or (*b*) to the smaller amount of shale in the larger coke. Work on this aspect of the problem is proceeding.

So far no general relationship between the amount of




**Brazier Used for Testing Coals.**

" bats " produced and the shatter index of the coke has been observed.

### A General Relationship Between the Quality and Use of Coke as a Domestic Fuel, and Ash Distribution.

Under this heading we may summarize a number of well-known facts—for example, there is no simple general re-

lation between either the proximate or ultimate analysis of coals and their suitability for use in making coke.

Fieldner[1] has stated that the principal favourable effect of washing coal is the improvement in the quality of the coke. Washing reduces the percentage of ash by eliminating free impurities such as shale, slate, and pyrites; and as the strength of the coke is generally important, it is to be noted that usually less breeze is obtained from a clean than from an unwashed coal. Flat pieces of slate or shale cause formation of additional fractures due to differences in expansion and lack of adherence between true coke and impurities. There is also the question of appearance of the coke to be considered.

It is a fortunate coincidence that in many coals the finer material contains the greater part of the impurities, but it has been demonstrated that in other cases this is not so, and the "bat" trouble to which I have referred could probably be reduced by "blending" such as has been made use of at coke ovens for many years, and is much used on the Continent. In blending, any particles of shale remaining in the coal would be crushed and so prevented from yielding "bats." Deakin and Braunholtz[2] indicate that for strong coke the proportion of coal above ¼ in. should be a minimum, and, although their remarks refer particularly to metallurgical coke, it is well to note that coke made from coarse coal tends to be more fissured, weaker, and less homogeneous.

### Simple but Rapid Test Giving a Good Idea of "Ash Distribution" in Coal.

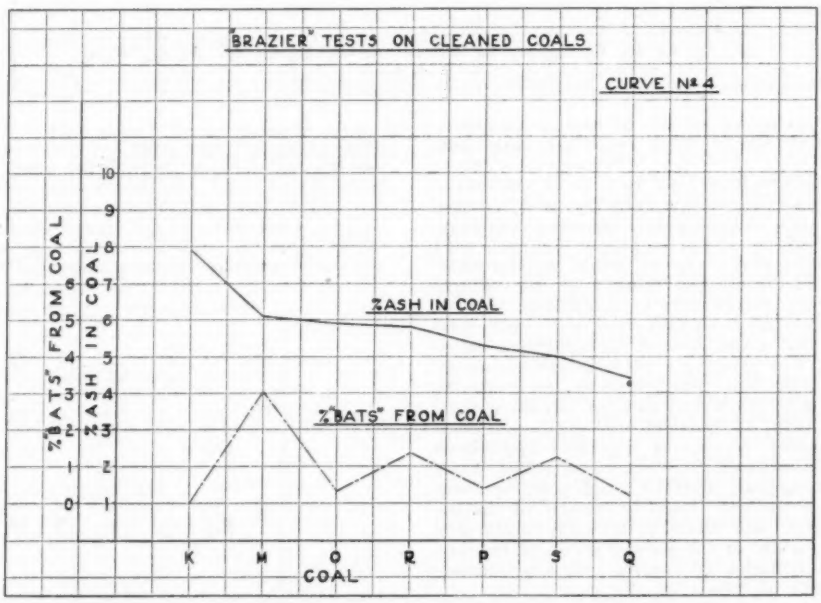
While assuming that the collieries are endeavouring generally to supply the Gas Industry with cleaner coal than was formerly the case, the question of ash distribution, as previously mentioned, appears to have received little attention except in so far as various cleaning processes may have affected it incidentally. It occurred to us that some simple test from which results of reasonable accuracy could be obtained rapidly would enable unsuitable deliveries to be discussed with the colliery people on the day of arrival would do much to focus attention on the matter. Accordingly several small "braziers" were made (see illustration). The metal of the brazier body is 10 gauge. After the trucks had been sampled in the usual way, a definite weight of coal—usually 20 lbs. in the case of nut coal—was burned in the brazier and the "bats" or stone weighed and returned as a percentage on the coal as received. This method has proved rapid, the time for a test being about 6 hours, and clinkering conditions are avoided.

### Results from the Brazier Test.

The results shown on Curve 4 are from a number of different coals, and each is the average of a number of tests. The curve shows how a certain coal is a great offender, and it will be observed that the same coal, or rather the coke made from it, gives poor results in the slow-combustion stove and open grate. The ordinary ash test would not disclose this important fact. Some may argue that the holes in the bottom of the brazier are not strictly comparable with an ordinary appliance, but it is pointed out that at any rate the coals receive similar treatment and the results are comparable.

### Conclusion.

In conclusion, it is realized that these remarks have been perhaps rather disconnected and that many aspects of the problem have been omitted or have received scanty reference. The interesting work of Kemp[1] in this country on the application of X-rays to the examination of coal, and the investigation of ash skeletons by Continental workers, are examples, while the vexed questions of "Reactivity," "Combustibility," and "Ignitability" of coke, and the catalytic influence of ash constituents upon those properties, are others to each of which papers could well be devoted. But taking a broad view of the use of domestic coke, the chief problem in burning it, especially in appliances having a comparatively small draught, is to bring the fuel into intimate contact with a sufficient quantity of air for its complete oxidation. In practice the difficulty is illustrated by the necessity for supplying a quantity of air in excess of that theoretically required for complete combustion. Therefore, in order to approach optimum conditions the coke should be closely screened and care should be taken to select the proper size for each particular appliance. The question of cleanness cannot be stressed too strongly if the fuel is to be used for household purposes, and attention should be paid to both inherent and extraneous ash. A high proportion of inherent ash in the case of open grates may cause the pieces of fuel to become coated with ash and so retard combustion, apart from having a very dull and lifeless appearance, while a large proportion of extraneous ash tends to produce "bats" which, in stoves and boilers, cover the bars and obstruct the draught. Probably, also, in the future more attention will be given to ash-fusion ranges.




Although it is not an easy task to supply a perfect domestic coke, yet there appears good ground for an optimistic outlook; and we may conclude with a quotation from the Cantor Lectures on "The Treatment of Coal"[2] by Dr. Lander, late Director of Fuel Research. He said: "There is an undoubted demand for improved qualities of coke, and it is possible to produce gas coke which possesses many of the advantages claimed by various types of low-temperature fuels, but, in order to develop the fullest advantages of gas coke it is essential that it shall be (*a*) Dry, (*b*) Clean, and (*c*) Screened.

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A brief discussion followed, after which **Mr. D. L. Copp** (Exeter), in proposing a vote of thanks to Mr. Marsden, said that he had an easy task in doing so, in view of the excellent, thought-provoking paper to which they had listened to.

**Mr. C. Bateman** (Bath) seconded the proposal and complimented Mr. Marsden on an excellent paper prepared at short notice.

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[1] U.S. Bureau of Mines. Report of Investigations 3020 (see "Fuel in Science and Practice," Vol. IX., No. 11, p. 533).
[2] "Gas World" (Coking Section, 1929, 10, 3).

[1] Kemp., Proc. Roy. Soc. Edin., 1928, 48, 167.
[2] Royal Society Arts, 1929.

# Gas Companies' Results in 1932

**Alliance and Dublin.**

The accounts of the Alliance and Dublin Consumers' Gas Company for the half-year ended Dec. 31 last, show a profit on the revenue account of £66,499, and, after providing for interest on debenture stock, interest on temporary loans, and income-tax, there remains the sum of £52,801, to which must be added the sum of £30,379, being the balance brought from the last account, making a total of £83,180. Because of the higher cost of coal due to the import duty of 5s. per ton on British coal, the amount required to meet Corporation Profits Tax to which the Undertaking was made subject by the Finance Act of 1932, and to the necessity of making provision for the accrued portion of liabilities in respect of commitments entered into prior to the unforeseen import duty on coal and Corporation Profits Tax, the net earnings for the half-year are insufficient, without encroaching substantially on the balance brought from the last account, to meet the amount required to pay a dividend at the rate of £7 12s. 6d.% per annum, this being the maximum statutory dividend permissible when gas is sold at the rate obtaining during the half-year concerned. The Directors do not consider that it would be prudent to deplete the carry-forward more than is necessary to pay a dividend at the rate of £7% per annum, less income-tax, on the consolidated ordinary stock of the Company, and therefore recommend the declaration of a dividend at this rate. This will absorb the sum of £54,315, after which a balance of £28,865 will remain to be carried to the next account.

**Barnard Castle.**

Col. H. C. Watson presided at the Annual Meeting of the Barnard Castle Gas Company, when the Directors reported a profit on the year of £739, and recommended a dividend of 2½% on the original consolidated stock and £1 15s. 7d.% on the new ordinary stock. These dividends were agreed to. It was stated that an early opportunity would be taken of further reducing the price of gas to consumers.

**Cheltenham.**

The Directors of the Cheltenham and District Gas Company submitted accounts for the year ended Dec. 31, 1932, showing a profit of £25,508 for the year. The quantity of gas sold to consumers during the year was 622,592,800 c.ft., being an increase of nearly 8 million c.ft. over the amount sold in the preceding year. The fact that the quantity sold last year, which was phenomenal, should not only have been maintained but exceeded to such an extent, is regarded as eminently satisfactory, particularly in view of the tendency among all classes of the community to economize in every possible direction, and demonstrates that gas and coke are being increasingly regarded as the most economical forms of fuel for domestic purposes. A full year's working of the supply to Tewkesbury and Winchcomb has proved that, without any material increase in overhead charges, the existing plant is more than equal to the increased demand, and the service has given complete satisfaction in the added areas; indeed, the Company are receiving constant applications for gas from outlying districts. The Directors have been in negotiation with the Directors of the Pershore and District Gas and Lighting Company, Ltd., with a view to the acquisition of that Undertaking, a matter which was the subject of a resolution at an Extraordinary General Meeting held after the close of the proceedings of the Annual General Meeting. The Directors desire to place on record their appreciation of the services to the Company of the late Mr. C. W. Welford, who died very suddenly on May 16, 1932, and who had been associated with the Company for nine years as Accountant and Commercial Manager. A dividend was declared at the rate of 5% per annum on the paid up consolidated ordinary stock of the Company for the year ended Dec. 31, 1932, out of the profits of that year.

**Cleveland.**

The half-year's working of the Cleveland Gas Company shows a profit of £687. In view of the industrial depression and the closing down of the Skinningrove Coke Ovens, necessitating the putting into operation of the Company's carbonizing plant, the Directors consider it advisable to conserve the Company's cash resources by postponing the declaration of a dividend.

**Cork.**

The 128th Ordinary General Meeting of the Cork Gas Consumers' Company was held at the Offices, 72, South Mall. Mr. Wm. B. Harrington, F.C.S. (Chairman), presided. The Chairman, proposing the adoption of the Directors' report and statement of accounts, said: The results for the last half-year are very favourable, the sale of gas exceeding that of the corresponding period in 1931 by over 10¾ million c.ft. There has also been a good increase in the return from residual products which is mainly attributable to the extended use of coke for industrial and domestic purposes, and to an improvement in the demand for tar products. In 1932 the cost and freight of the coal carbonized was £29,900. The manufacture of this coal into gas, coke, tar products, and sulphate of ammonia entailed the expenditure of £57,000 in wages and salaries, and £19,000 in rates, taxes, and duties; or, to put it in another way, for every £ paid for coal and freight, over £2 10s. was spent in Cork on wages, salaries, rates, taxes, &c. In this connection it will interest you to know that the bulk of our meters are now being made in Cork. This is a new local industry. Since the corresponding period of last year we have a net increase of 640 in the number of new consumers, and the number of cooking stoves sold or hired have increased by 680. In addition to the cooking stoves, we have fixed over 1000 other forms of gas apparatus. A dividend at the rate of 8% per annum for the half-year was declared.

**Dover.**

The accounts of the Dover Gas Company for the year show that, after providing for all fixed charges (including £673 for depreciation of stoves on hire, £1028 for the special purposes fund, and £1028 for the renewals fund), there remains an available balance of £18,566. Out of this the Directors recommended declaration of a final dividend to Dec. 31, 1932, at the rate of 4¾%, less income-tax (making, with the interim dividend paid in September last, 8½% for the year). During the past year the water gas plant has been modernized and a spiral gasholder has been erected in the tank of the old gasholder, which has been disused for many years. An additional steam boiler and a larger exhauster have also been installed. The price of gas was reduced by ½d. per therm (equal to 2½d. per 1000 c.ft.) as from the end of the Lady Day Quarter, 1932. £17,500 of the new stock created at the last annual meeting was sold by tender in April last, and realized an average price of £129 per £100 stock.

**Hexham.**

Mr. William Pattinson presided at the Annual Meeting of Hexham Gas Company, and in moving the adoption of the statement of accounts, Alderman J. H. Brogdon referred to the recent issue by tender of Ordinary stock. The amount offered was £10,000, and the applications exceeded this by 75%. The average price received was at the rate of 22s. per £1 stock, and it was gratifying to note that the quotation on Newcastle Stock Exchange had been maintained at that figure. The accounts showed that the business of the Company had been well maintained, and the profits were approximately the same. The issue of the new stock had not increased the capital liability of the Company, as it was applied to the paying off of certain loans. Renewals of mortgage had taken place at a reduced rate of income. The number of consumers again showed a substantial increase, while the demand for gas appliances for domestic use continued to grow. A dividend of 6%, less tax, inclusive of the interim dividend of 2½% paid in September was declared on the ordinary stock.

**Launceston.**

The Annual General Meeting of the Launceston Gas Company was held on Monday, March 13. The Chairman (Mr. E. D. Pethybridge, J.P.) said that although times were so bad, the Company could again report a good increase in sales of gas, and the year's results generally were highly satisfactory. After increasing depreciation allowance, providing for retort renewals, and special purposes fund out of revenue, and deducting bank and mortgage interest to Dec. 31, there remained a net profit available of £1298—an increase of £540. He proposed the payment of the usual dividends, absorbing £576, carrying £500 to reserve, and leaving a balance of £222 to be brought forward to next year's account. The sales of fittings and apparatus for the year reached a further high level, and unaccounted-for gas had been reduced by over 2%.

**Londonderry.**

The Directors of the Londonderry Gaslight Company submit accounts for the year ended Dec. 31, 1932, which show that the undivided balance brought forward from the previous year's profit and loss account, after payment of dividend, amounts to £13,938, to which is added the year's profit, as shown by revenue account, £3666, making a total of £17,605. Out of this sum there has been paid and provided for a year's interest on the loan capital and loss on redemption of War Loan, leaving a balance of £17,282. The Directors propose to pay a dividend for the year to Dec. 31, 1932, at the rate of 10% on the old shares, and at the rate of 7% on the new shares, less income-tax, which will absorb £3382, and carry forward to the next account the sum of £13,900. The consumption of gas shows an increase as compared with the previous year. A sum of £6800 has been charged in the revenue account for the purpose of meeting future cost of renewals. The actual expenditure of £6082 incurred during the year has been charged against the suspense account.

**St. Austell.**

The revenue from the sale of gas by the St. Austell Gas Company is rather less than that of the previous year, due to a slightly decreased demand, owing to the prevailing industrial depression, but more particularly to the effect of the recent decrease in the price charged for gas, which operated over the whole year. The new gas main along the by-pass road has proved of great advantage in maintaining a satisfactory supply of gas in the district served by it. The new gasholder referred to in the last report has been in continuous use during the past year and is working very satisfactorily. The erection of this holder has enabled necessary repairs to be carried out on No. 2 holder which have been completed, and the holder is now in normal use. The balance standing to the credit of profit and loss account amounting to £2139, the Directors recommended should be appropriated as follows: In paying a dividend at the rate of 8½% per annum on old shares and 7% per annum on new shares, less income-tax; in carrying to reserve fund the sum of £200, which leaves an amount of £1115 to be carried to next account.

**Seaham.**

Mr. Malcolm Dillon, who presided at the Annual Meeting of the Seaham Gas and Lighting Company, in moving the adoption of the report, said that it was well to bear in mind that gas was the cheapest and best form of illuminant, and if the authorities at Seaham had adopted incandescent gas burners for street lighting, it would have been of great advantage to the inhabitants and would compare very favourably with the present electric lighting. The accounts showed a profit of £2655, to which was added £1101 brought forward, making £3751. After paying interest on mortgages, interim dividends, and transfer to plant renewals account there was left the sum of £1849. After paying the final dividends, £1111 was to be carried forward. Dividends of 2¼% on the preference stock, making 4½% for the year, 3% on the "A" stock and "B" shares, making 6% for the year, and 2¼% on the other stock, making 4½% for the year, were declared.

**Seaton.**

At the Annual Meeting of the Seaton Gas and Coke Company, Ltd., on Feb. 27, a dividend of 7%, less tax, was declared.

**Shanklin.**

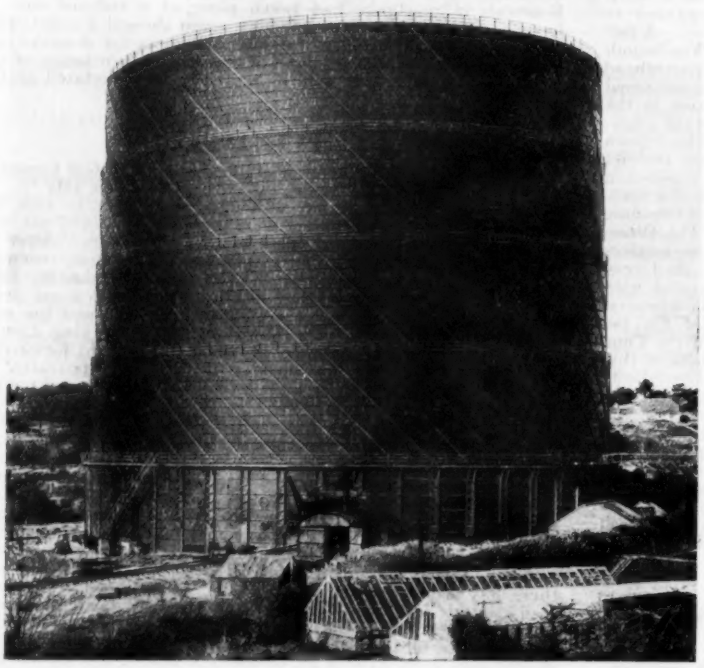
Mr. W. T. Deeks (Deputy-Chairman of Directors) presided at the Annual General Meeting of the Shanklin and Ventnor Gas Company. The annual report on the year's working showed that the balance standing to the credit of the profit and loss account is £11,983, after payment of an interim dividend of 4%, less income-tax. The Directors recommended the declaration of a final dividend of 4% for the half-year, making 8% for the year, less income-tax. There has been an increase in the sale of gas over the year 1931 on the combined undertakings. The amalgamation of the Shanklin Gas Company and the Ventnor Gas Company under a Special Order by the Board of Trade, as mentioned in the previous report, took effect as from July 1, 1932, when the manufacture of gas ceased at the Ventnor Works. In accordance with the provision of the Order the accounts of the Ventnor Company have been incorporated from Jan. 1, 1932. The new carbonizing and other plant was put into operation during the year, and the results are reflected in the accounts.

**Sheppy.**

The sales of gas by the Sheppy Gas Company have satisfactorily increased during the past year. There has also been an increase in the number of consumers. During the latter part of the year the Directors considered it opportune to raise £10,000 additional capital. This capital was issued as 5% perpetual debenture stock. The issue was largely over-subscribed. By reason of the continued increase in the sales of gas, the Directors considered it very necessary to proceed with the erection of an additional gasholder. This holder will have a capacity of 400,000 c.ft., and should be ready for use in August next. In October last the Directors appointed Mr. B. A. Carpenter, the Engineer, Manager, and Secretary, a Director of the Company, in recognition of his services and interest shown in the progress of the Company during the past 25 years. The price of gas was reduced on Jan. 1, 1932. Interim dividends were paid, less income-tax, for the first half-year ended June 30, 1932, of 4% per annum on the "A" preference shares, 5¼% per annum on the consolidated ordinary stock, and 6% per annum on the preference stock, and the Directors recommended the payment of dividends for the half-year ended Dec. 31, 1932, of 4% per annum on the "A" preference shares, 5¼% per annum on the consolidated ordinary stock, and 6% per annum on the preference stock, less income-tax in each case.

**South Shields.**

The Annual Meeting of the South Shields Gas Company was held at the Company's Offices—Mr. Thomas W. Wallis (Chairman of Directors) presiding. The report on the year's working showed a profit amounting to £20,681, and dividends of 8½% on consolidated and 5¾% on ordinary stock were recommended.



AT BOURNEMOUTH—CAPACITY 5 MILLION CUBIC FEET.

C. & W. WALKER, LTD.
DONNINGTON,
Nr. WELLINGTON—SHROPS.
ARE
MAKERS OF
THE
LARGEST SPIRAL
HOLDER
IN A STEEL TANK
IN THE WORLD.
THE
LARGEST WORKING
GUIDEFRAMED
HOLDER
CONSTRUCTED
IN THIS COUNTRY.

London Office - - - 70, VICTORIA STREET, WESTMINSTER, S.W.1.

The revenue amounted to £120,957, and the expenditure to £100,276. To the profit is added a balance of £14,227 from the previous year. After paying dividends, &c., it is proposed to carry forward £14,079. Owing to the mild weather early in the year and the trade depression, the sale of gas showed a decrease of 4·39%, as compared with the previous year. Efforts had been made to popularize the use of gas coke nuts, and satisfactory results had been achieved. During May £20,000 ordinary stock was sold by tender and realized an average of £95 per £100.

**South Staffordshire Mond.**

The amount of fuel gasified by the South Staffordshire Mond Gas Company during the year is 6% more than last year, while the cost of fuel gasified is 9% more than for 1931. The gas distributed during the year is 5% more than during 1931. The gross profit for the year is £17,736. Deducting prior lien and debenture stock interest of £12,916 leaves a net profit for the year of £4820. £22,029 has been brought forward from the previous year, which makes the amount of undivided profit standing to the credit of the profit and loss account at Dec. 31, 1932, £26,850. The Directors recommended that a dividend of 6% for the year 1930 be paid, less tax, to holders of cumulative preference shares on the register at that date. After paying this preference dividend, the amount standing to the credit of profit and loss account is £21,900.

**Thirsk.**

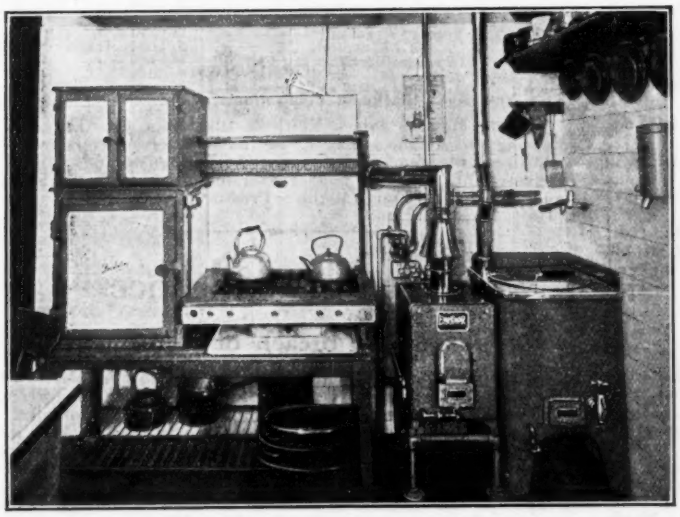
The annual report of the Thirsk Gas Company shows a profit of £1701, and the profit and loss account, after being charged with the interim dividend and interest on the preference shares and debentures and bank charges, has a credit balance of £1732. A dividend of 2½%, less income-tax, on the £12,000 share capital is recommended, making, with the interim dividend, 5% for the year. It is also recommended that £200 should be written off the debenture suspense account for gasholder redemption, and that £200 should be written off meters and cookers, leaving a balance of £1032 to be carried forward.

**Weston-super-Mare.**

The sales of gas by the Weston-super-Mare Gaslight Company show an increase of 0·84%, and the quantity of gas consumed constitutes the record figure of over 420 million c.ft. The Directors recommended the payment of the maximum dividend of 5% on the ordinary stock, the maximum dividend of 6% on the 6% redeemable preference stock, and the maximum dividend of 5% on the 5% preference stock for the half-year ended Dec. 31, 1932, less income-tax.

**Woking.**

An abnormal rate of increase in the number of consumers and exceedingly satisfactory progress in other directions were features of the report of the Directors presented at the 36th Ordinary General Meeting of the Woking District Gas Company held at the Company's Offices, 6, Great Winchester Street, Old Broad Street, London. The meeting was presided over by Mr. Lawrie Trewby, Chairman of Directors. The Directors report stated that in comparison with the year ended Dec. 31, 1931, there was a decrease in the quantity of gas sold of 1,314,085 c.ft., or 0·67%. If, however, the quantity of gas used for public lighting during 1931 was eliminated, the consumption during 1932 was greater by 6,579,328 c.ft., or 3·49%, than that of 1931. Receipts from the sale of residual products showed a decrease of £75. The net gains in consumers during the year numbered 681 and 2355 cookers, gas fires, &c., had been fitted. The profit on revenue account, including interest receivable, was £12,671, and after charging interest on debentures, loans, &c., and income-tax, amounting in total to £5377, there remained a balance of £7294, which represented the net profit for the year, to which must be added £6793, the balance brought forward from last account. The interim dividends absorbed £3729, leaving a disposable balance of £10,358. The Directors recommended that final dividends for the year ended Dec. 31, 1932, be paid at the following rates (less income-tax): On the "A" ordinary stock, £5 5s.%, making £10 10s.% for the year; on the "B" ordinary stock, £3 13s. 6d.%, making £7 7s.%; on the "C" preference stock, £2 10s.%, making £5%; on the 8% redeemable preference stock, £4%, making £8%. This appropriation would amount to £3729, leaving a balance of £6629, out of which it was proposed to write off £2362, the discount on the 5% redeemable debenture stock issued in February, 1932, leaving £4266 to be carried forward to next account. In moving the adoption of the report and accounts, the Chairman drew attention to the fact that they had spent over £15,000 on new mains and nearly £2000 on new meters. This represented an addition of 12 miles of main and 681 additional consumers. Last year 531 new consumers were connected, making a total of 1200 in two years. As their normal rate of increase was 300 a year, this figure had been doubled during the last two years. They had now 2224 ordinary consumers and 5846 slot, or a total of 8070.

A fully equipped kitchen outfit comprising "EMPEROR" Automatic Gas Water Heater as companion to a Berkeley cooker and a wash boiler

*Free advice and estimates for all requirements in heating, hot water supply and allied equipment readily given.*

"Potterton" Boilers and Hot Water Systems are fully displayed at the
"IDEAL HOME" EXHIBITION, OLYMPIA
STAND No. 70, Ground Floor, Main Hall

# COMFORT IN THE HOME

The elimination of arduous labour in the kitchen is one of the greatest achievements of modern practice in house equipment and of which Gas appliances fulfil a most important part. The all-enamelled finish of the "EMPEROR" Gas Water Heater, yielding as it does hot water, controlled thermostatically to the required temperature, constantly on tap, removes one of the difficulties which has often confronted the housewife in the past. Gas can also be used most advantageously for central heating with low pressure hot water circulating radiators with fully automatic effect, of which an example is also here shown.

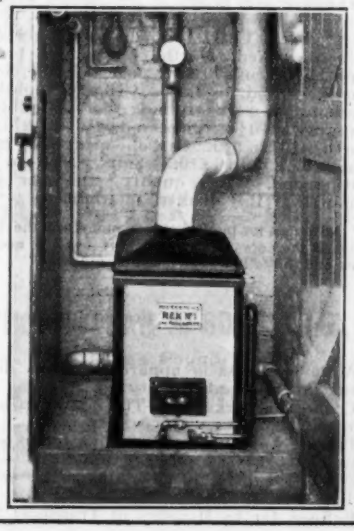


Illustration of a "REX" Gas-fired Heater installed to replace a coke-fired boiler formerly used for central heating, thus eliminating all dust and labour in stoking. Inspection invited.

THOMAS POTTERTON (HEATING ENGINEERS) LTD.
Cavendish Works, BALHAM, LONDON, S.W. 12
TELEPHONE: BALHAM 1244-5-6 TELEGRAMS: "POTTERTON, BAL, LONDON."

# GAS MARKETS & MANUFACTURES

## Stock Market Report.

[For Stock and Share List, see later page.]

In view of the close proximity of Budget Day, markets are tending to become dull and uninteresting. This was the case last week when the bulk of the business again centred round gilt-edged and other high-class investment securities, but with a certain amount of profit-taking in evidence very few of the prices reached the previous week were maintained. As indicated by the report of several important trading concerns recently published, there are distinct signs that industrial conditions are improving. Imperial Chemical Industries, Ltd., show an increase in net profit of nearly 1½ million pounds, while several other concerns have been able to resume payment of preference dividend.

In common with other high-class securities, Gas stocks and shares were in the usual good demand, and prices continue to harden. A comparison of the prices of ordinary stocks ruling at the present time with those at the commencement of the year, when they included about four months' dividend, shows that even in this short time, and after the dividend payments, substantial improvements have been made in many cases. Moreover, given a continuance of the present era of cheap money with a maintenance of dividend disbursements, the existing prices will doubtless be maintained, though a return to anything like boom conditions in the industrial markets may eventually tend to bring about some depreciation in values.

The chief feature last week was a rise of 11 points, to 152-157, in Brighton, Hove, and Worthing 6% consolidated. A dividend of 7½% per annum has been paid on this stock since 1928, and the yield on the current middle market price works out at £4 17s. 1d.%, so that, compared with the yields obtainable on the ordinary stocks of similar undertakings, there is justification for still further improvement. It will be seen from the Stock and Share List that a number of issues rose from 1 to 3 points.

## Current Sales of Gas Products.

### The London Market for Tar Products.

LONDON, *April* 3.

The position in the tar products market is as follows:

Pitch remains quiet, and the price is called 90s. to 92s. 6d. per ton f.o.b., according to period of shipment.

Creosote is about 2½d. to 3d. per gallon f.o.b. for B.E.S.A. Specification.

Refined tar is about 4d. to 4¼d. per gallon in bulk at makers' works.

Pure toluole is about 2s. 4d.; pure benzole, about 1s. 11d.; solvent naphtha, 95/160, about 1s. 7d. to 1s. 8d.; and 90/140 pyridine bases, 3s. 6d. to 3s. 9d. per gallon naked at makers' works.

### Tar Products in the Provinces.

*April* 3.

The average prices of gas-works products during the week were: Gas-works tar, 34s. to 39s. Pitch—East Coast, 85s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 85s. f.o.b.* Toluole, naked, North, 1s. 9d. to 1s. 10d. Coal-tar crude naphtha, in bulk, North, 6d. to 6¼d. Solvent naphtha, naked, North, 1s. 5½d. to 1s. 6d. Heavy naphtha, North, 10d. to 11d. Creosote, *ex* works, in bulk, North, liquid and salty, 2¼d. to 2¾d.; low gravity, 1¼d.; Scotland, 2¼d. to 2¾d. Heavy oils, in bulk, North, 4¾d. to 5¼d. Carbolic acid, 60's, 2s. 9d. to 2s. 10d. Naphthalene, £9 to £10. Salts, 55s. to 75s., bags included. Anthracene, "A" quality, 2¾d. per minimum 40%, purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

### Tar Products in Scotland.

GLASGOW, *April* 1.

More liveliness is apparent in this district, but prices continue far from satisfactory.

Crude gas-works tar.—The actual value is 42s. 6d. to 47s. 6d. per ton *ex* works.

Pitch.—Any supplies available for export are being offered at round 80s. to 82s. 6d. per ton f.o.b. Glasgow. In the home market, the price is now about 82s. 6d. per ton *ex* works in bulk.

Refined tar to Ministry of Transport Specification is slightly more active, but value is unchanged at 3¾d. per gallon f.o.r. in buyers' packages.

Creosote oil is in slightly better demand in the home market, but values remain weak. B.E.S.A. Specification is 2½d. to 3d. per gallon; low gravity, 2¼d. to 2¾d. per gallon; and neutral oil, 2½d. to 3d. per gallon—all in buyers' rail tanks *ex* works.

Cresylic acid.—More business has been placed in this product, and it would appear that prices are now at their lowest. Pale, 97/99%, is 10d. to 11d. per gallon; dark, 97/99%, 9d. to 10d. per gallon; and pale, 99/100%, 1s. 1d. to 1s. 2d. per gallon—all f.o.r. in buyers' packages.

Crude naphtha is scarce, and the price is not lower than 4½d. to 5d. per gallon, according to quantity and quality.

Solvent naphtha.—90/160 grade is not too plentiful, and value is 1s. 3d. to 1s. 4d. per gallon *ex* works. In the case of 90/190 grade, this is only in small request at 11d. to 1s. per gallon.

Motor benzole.—Available supplies command round 1s. 4d. to 1s. 5d. per gallon f.o.r. in buyers' packages.

Pyridines.—To-day's prices are firmer. 90/160 grade is 3s. to 3s. 3d. per gallon, and 90/140 grade 3s. 3d. to 3s. 6d. per gallon.

### Benzole Prices.

These are considered to be the market prices for benzole at the present time.

| | s. d. | | s. d. | |
|---|---|---|---|---|
| Crude benzole . . . . | 0 10½ | to | 0 11 | per gallon at works |
| Motor ,, . . . . . | 1 6½ | ,, | 1 7 | ,, ,, ,, |
| Pure ,, . . . . . | 1 10 | ,, | 1 11 | ,, ,, ,, |

## Contracts Advertised To-Day.

**Coal.**

Newbury Gas Undertaking. [p. 66.]
Gainsborough Gas Undertaking. [p. 66.]

## Trade Notes.

### Two New Keith-Blackman Publications.

From Messrs. James Keith & Blackman Co., Ltd., of 27, Farringdon Avenue, E.C. 4, we have received copies of two additions to their wide range of catalogues and booklets—Raising and Lowering and Traversing Gear, and Air Blowing and Exhausting Fans (Medium Pressure).

# Legal Intelligence.

## Claim for Breach of Agreement.

At Birmingham Assizes on Monday of last week Mr. Justice Talbot heard a case in which a claim for breach of agreement and wrongful dismissal was brought by Frank Hollyoke, 24, Holyhead Road, Handsworth, against the Shropshire, Worcestershire, and Staffordshire Electric Power Company. The plaintiff, who was formerly Secretary and Distribution Manager of the Halesowen Gas Company, alleged he was induced, in 1930, to leave and take a position with the defendant Company, starting at a small salary, on the promise of an ultimate position equivalent to, if not better than, that which he held with the Halesowen Gas Company. This, he said, never eventuated, and he was ultimately given a month's notice without proper cause.

The defendants denied any such agreement, and said the dismissal was reasonable.

Evidence having been heard, the Judge said he had come to the conclusion there was no evidence of any contract beyond that for the position which the plaintiff was given. No doubt there was expectation by the plaintiff, and he did not doubt that the Company thought he would prove a useful servant, and would rise to something better; but as to any contract that, after a certain period, he was to get more than he received with the Halesowen Gas Company, there was none, his Lordship held. Judgment was therefore given for the defendant Company, the Judge also finding in their favour on the period of notice of dismissal.

Mr. Justice Talbot added that in coming to that conclusion he expressed no opinion one way or another as to whether plaintiff had in fact been fairly treated, or on any other question.

# STOCK AND SHARE LIST.

**Official Quotations on the London and Provincial Stock Exchanges.**

**[For Stock Market Report, see earlier page.]**

| Issue. £ | Share. | When ex-Dividend. | Dividends. Prev. Hf-Yr. % p.a. | Dividends. Last Hf-Yr. % p.a. | NAME. | Quotations. April 1. (Provincial Exchanges March 31.) | Rise or Fall on Week. | Transactions. Lowest and Highest Prices During the Week. |
|---|---|---|---|---|---|---|---|---|
| 1,551,868 | Stk. | Oct. 3 | 7½ | 7½ | Alliance & Dublin Ord. ... | 115—125 | ... | 121—124½ |
| 374,000 | „ | Jan. 9 | 4 | 4 | Do. 4 p.c. Deb. ... | 85—95 | ... | ... |
| 557,655 | „ | Mar. 6 | 7 | 7 | Barnet Ord. 7 p.c. ... ... | 150—155 | ... | ... |
| 300,000 | 1 | Oct. 17 | 1/9‡ | 1/4‡ | Bombay, Ltd. ... ... | 24/6—26/6 | ... | ... |
| 178,280 | Stk. | Feb. 20 | 9½ | 9½ | Bournemouth sliding scale | 192—202 | ... | ... |
| 550,050 | „ | „ | 7 | 7 | Do. 7 p.c. max. ... | 152—162 | ... | 160 |
| 439,160 | „ | „ | 6 | 6 | Do. 6 p.c. Pref. ... | 137—142 | ... | ... |
| 50,000 | „ | Dec. 19 | 3 | 3 | Do. 3 p.c. Deb. ... | 75—80 | ... | ... |
| 162,025 | „ | „ | 4 | 4 | Do. 4 p.c. Deb. ... | 101—106 | ... | 103½ |
| 210,000 | „ | „ | 5 | 5 | Do. 5 p.c. Deb. ... | 122—127 | +2 | 124½—125 |
| 357,900 | „ | Mar. 6 | 7½ | 7½ | Brighton, &c. 6 p.c. Con. ... | 152—157 | +11 | ... |
| 540,000 | „ | „ | 6‡ | 6‡ | Do. 5 p.c. Con. ... | 141—146 | +1 | 143—145 |
| 195,500 | „ | „ | 6 | 6 | Do. 6 p.c. B Pref. | 133—143* | ... | ... |
| 1,487,500 | „ | Mar. 6 | 5 | 5 | Bristol 5 p.c. max. ... ... | 111—112a | +½ | ... |
| 120,420 | „ | Dec. 19 | 4 | 4 | Do. 1st 4 p.c. Deb. ... | 99—101a | ... | ... |
| 217,870 | „ | „ | 4 | 4 | Do. 2nd 4 p.c. Deb. ... | 99—100a | ... | ... |
| 328,790 | „ | „ | 5 | 5 | Do. 5 p.c. Deb. ... ... | 120—124a | ... | ... |
| 855,000 | „ | Oct. 3 | 8 | 7 | British Ord. ... ... ... | 145—150 | ... | 148—150 |
| 100,000 | „ | Dec. 19 | 7 | 7 | Do. 7 p.c. Pref. ... ... | 140—150 | ... | ... |
| 350,000 | „ | „ | — | 5½ | Do. 5½ p.c. Pref. ... | 105—110 | ... | ... |
| 120,000 | „ | „ | 4 | 4 | Do. 4 p.c. Red. Deb. ... | 95—100 | ... | ... |
| 450,000 | „ | „ | 5 | 5 | Do. 5 p.c. Red. Deb. ... | 105—115 | ... | 107½ |
| 160,000 | „ | Jan. 9 | 5 | 5 | Cambridge 5 p.c. Deb. ... | 117—122 | ... | ... |
| 100,000 | 10 | Dec. 5 | 6 | 6 | Cape Town, Ltd. ... ... | 7½—8½ | ... | ... |
| 100,000 | 10 | Nov. 7 | 4½ | 4½ | Do. 4½ p.c. Pref. ... | 6—7 | .. | ... |
| 150,000 | Stk. | Dec. 19 | 4½ | 4½ | Do. 4½ p.c. Deb. ... | 88—93 | ... | ... |
| 626,860 | „ | Feb. 20 | 6 | 6 | Cardiff Con. Ord. ... ... | 108—113 | ... | ... |
| 237,860 | „ | Jan. 9 | 2½ | 5 | Do. 5 p.c. Red. Deb. | 105—110 | ... | ... |
| 157,150 | „ | Feb. 20 | 5 | 6½ | Chester 5 p.c. Ord. ... ... | 93—98b | ... | ... |
| 98,936 | 1 | Oct. 17 | 2/- | 2/- | Colombo, Ltd. Ord.... ... | 25/-—30/- | ... | ... |
| 24,500 | 1 | Oct. 17 | 1/4‡ | 1/4‡ | Do. 7 p.c. Pref. ... | 19/-—21/- | ... | ... |
| 609,204 | 1 | Mar. 20 | /11'48 | /11'48 | Colonial Gas Assn. Ltd. Ord. | 15/6—17/6* | ... | ... |
| 296,053 | 1 | „ | 1/8'30 | 1/8'30 | Do. 8 p.c. Pref. | 19/-—21/-* | ... | ... |
| 1,796,955 | Stk. | Feb. 20 | 5 | 6½ | Commercial Ord. ... ... | 112—117 | ... | 115—116½ |
| 475,000 | „ | Dec. 19 | 8 | 8 | Do. 8 p.c. Deb. ... | 75—80 | ... | ... |
| 265,272 | „ | Mar. 6 | — | 5 | Do. 5 p.c. Deb. ... | 119—124 | ... | 123 |
| 807,560 | „ | Feb. 20 | 7 | 7 | Croydon sliding scale ... | 145—150 | +2 | 147—149 |
| 469,590 | „ | „ | 5 | 5 | Do. max. div. ... ... | 101—106 | +1 | ... |
| 500,000 | „ | Jan. 9 | 5 | 5 | Do. 5 p.c. Deb. ... ... | 117—122 | ... | ... |
| 542,270 | „ | Mar. 6 | 7 | 10 | Derby Con. ... ... ... | 150—160c | ... | ... |
| 55,000 | „ | Jan. 9 | 4 | 4 | Do. 4 p.c. Deb. ... ... | 80—85c | ... | ... |
| 209,000 | „ | Mar. 6 | 5 | 5 | East Hull Ord. 5 p.c. ... | 100—105 | ... | ... |
| 179,500 | „ | Mar. 6 | 6 | 6 | East Surrey Ord. 5 p.c. ... | 118—123 | ... | ... |
| 155,019 | „ | Dec. 19 | 5 | 5 | Do. 5 p.c. Deb. ... | 117—122 | ... | ... |
| 1,002,180 | „ | Sept. 19 | †6½ | †5 | European, Ltd. ... ... | 135—140 | +3 | 135—139 |
| 19,373,992 | „ | Feb. 20 | 5½ | 5½ | Gas Light & Coke 4 p.c. Ord. | 25/—26/-f | ... | 25/6—25/10½ |
| 2,600,000 | „ | „ | 3½ | 3½ | Do. 3½ p.c. max. ... ... | 85—88 | +2 | 86—87½ |
| 4,477,106 | „ | „ | 4 | 4 | Do. 4 p.c. Con. Pref. ... | 101—104 | ... | 102—104 |
| 6,102,497 | „ | Dec. 19 | 3 | 3 | Do. 3 p.c. Con. Deb. ... | 80—83 | ... | 80½—82½ |
| 3,642,770 | „ | „ | 5 | 5 | Do. 5 p.c. Red. Deb. ... | 115—118 | ... | 116½—117½ |
| 3,500,000 | „ | „ | 4½ | 4½ | Do. 4½ p.c. Red. Deb. ... | 110—113 | ... | 111½—112½ |
| 270,456 | „ | Mar. 6 | 6 | 6 | Harrogate New Cons. ... | 113—118 | +½ | ... |
| 82,500 | „ | Mar. 6 | 7 | 7 | Hastings & St. L. 5 p.c. Conv. | 130—140 | ... | 130—130½ |
| 258,740 | „ | „ | 5½ | 5½ | Do. 5½ p.c. Conv. | 105—110 | ... | ... |
| 70,000 | 10 | Oct. 17 | †10 | †10 | Hongkong & China, Ltd. ... | 10½—11½ | ... | ... |
| 218,200 | Stk. | Mar. 6 | 6 | 6 | Hornsey Con. 5½ p.c. ... | 122—127 | ... | ... |
| 5,600,000 | „ | Nov. 21 | 14 | 14 | Imperial Continental Cap. | 202—212 | ... | 207—209½ |
| 223,130 | „ | Feb. 6 | 9½ | 9½ | Do. 9½ p.c. Red. Deb. | 89—94 | ... | 91 |
| 235,242 | „ | Mar. 6 | 8½ | 8½ | Lea Bridge 5 p.c. Ord. ... | 168—173 | ... | 169—170 |
| 2,145,907 | „ | Mar. 6 | 8 | 8 | Liverpool 8 p.c. Ord. ... | 124—126b | ... | ... |
| 245,500 | „ | Dec. 19 | 5 | 5 | Do. 5 p.c. Red. Pref. ... | 105—115b | ... | ... |
| 306,088 | „ | Jan. 19 | 4 | 4 | Do. 4 p.c. Deb. ... | 101—103b | ... | ... |
| 165,736 | „ | Feb. 20 | 8 | 10 | Maidstone 5 p.c. Cap. ... | 180—200 | ... | ... |
| 56,176 | „ | Dec. 19 | 3 | 3 | Do. 3 p.c. Deb. ... | 68—73 | ... | ... |
| 75,000 | b | Dec. 5 | †10 | †10 | Malta & Mediterranean ... | 8½—10½ | +1 | 9—9⅛ |
| 392,000 | — | Apl. 1 | 5½ | 5½ | Metropolitan (of Melbourne) 5½ p.c. Red. Deb. ... ... | 98—103* | ... | ... |
| 231,978 | Stk. | Mar. 6 | 5 | 5 | M. S. Utility "C." Cons. ... | 96—103 | ... | ... |
| 818,657 | „ | „ | 4 | 4 | Do. 4 p.c. Cons. Pref. | 92—97 | ... | 95½—97 |
| 112,126 | „ | Jan. 9 | 4 | 4 | Do. 4 p.c. Deb. ... | 102—104 | ... | 102½—102½ |
| 148,955 | „ | „ | 5 | 5 | Do. 5 p.c. Deb. ... | 115—120 | ... | ... |
| 675,000 | „ | 21 May '31 | 16 | 16 | Montevideo, Ltd. ... ... | 32—45 | ... | ... |
| 2,061,315 | „ | Mar. 6 | 5 | 5‡ | Newcastle & Gateshead Con. | 24/3—24/9d | +/3 | ... |
| 682,856 | „ | „ | 4 | 4 | Do. 4 p.c. Pref. ... | 100—102d | +1 | ... |
| 776,706 | „ | Jan. 9 | 3½ | 3½ | Do. 3½ p.c. Deb. ... | 89—91d | ... | ... |
| 277,285 | „ | Nov. 7 | 5 | 5 | Do. 5 p.c. Deb. '48... | 103—107d | ... | ... |
| 274,000 | „ | Feb. 20 | 5 | 5 | Newport (Mon.) 5 p.c. max. | 99—101a | ... | ... |
| 204,940 | „ | Mar. 20 | 7½ | 7½ | North Middlesex 6 p.c. Con. | 132—142* | ... | ... |
| 396,160 | „ | Feb. 6 | 5 | 5 | Northampton 5 p.c. max. ... | 98—103 | ... | ... |
| 300,000 | „ | Dec. 5 | 7 | 9 | Oriental, Ltd. ... ... | 112—117 | ... | ... |
| 205,162 | „ | Dec. 19 | 8 | 8 | Plym'th & Stonehouse 5 p.c. | 155—165 | ... | ... |
| 504,416 | „ | Feb 20 | 8 | 8 | Portsm'th Con. Stk. 4 p.c. Std. | 160—165 | ... | 163—165 |
| 241,446 | „ | „ | 5 | 5 | Do. 5 p.c. max. ... | 102—107 | ... | 103 |
| 114,000 | „ | Feb. 20 | 5 | 5 | Preston 5 p.c. Pref. ... ... | 103—108 | ... | ... |
| 686,312 | „ | Jan. 23 | 4 | 4 | Primitiva 4 p.c. Rd. Db. 1911 | 82—87 | ... | ... |
| 389,813 | „ | Dec. 19 | 4 | 4 | Do. 4 p.c. Cons. Deb. | 82—87 | ... | ... |
| 150,000 | 10 | Mar. 20 | 6 | 6 | San Paulo 6 p.c. Pref. ... | 6⅞—7½* | ... | 6⅞—7 |
| 1,736,968 | Stk. | Sept. 5 | 6 | 6 | Sheffield Cons. ... ... | 117—118e | +1 | ... 5 |
| 95,000 | „ | Jan. 9 | 4 | 4 | Do. 4 p.c. Deb. ... ... | 91—95e | ... | ... |
| 133,201 | „ | Feb. 20 | 5½ | 5 | Shrewsbury 5 p.c. Ord. ... | 125—130 | ... | ... |
| 90,000 | 10 | June 6 | 15 | 15 | South African ... ... | 3—5 | ... | ... |
| 6,709,895 | Stk. | Feb. 20 | 5 | 7 | South Met. Ord. ... ... | 127—130 | +1 | 127—129½ |
| 1,135,812 | „ | „ | 6 | 6 | Do. 6 p.c. Irred. Pf. | 138—143 | ... | 141—142½ |
| 850,000 | „ | „ | — | 20/-g | Do. 4 p.c. Irred. Pf. | 101—104 | ... | 102½—104 |
| 1,895,445 | „ | Jan. 9 | 8 | 8 | Do. 8 p.c. Deb. ... | 80—83 | +1 | 81 |
| 1 000,000 | „ | Jan. 23 | 5 | 5 | Do. 5 p.c. Red. Deb. | 114—117 | +3 | ... [illegible] |
| 209,820 | „ | Mar. 6 | 8½ | 8½ | South Shields Con. ... ... | 147½—152½d | ... | ... |
| 1,543,795 | „ | Feb. 20 | 6 | 6 | South Suburban Ord. 5 p.c. | 125—128 | ... | 126—127½ |
| 300,000 | „ | „ | 5 | 5 | Do. 5 p.c. Pref. | 112—117 | ... | 115½—116½ |
| 868,837 | „ | Dec. 19 | 5 | 5 | Do. 5 p.c. Deb. | 120—125 | ... | 122 |
| 647,740 | „ | Feb. 20 | 5 | 5 | Southampt'n Ord. 5 p.c. max. | 107—112 | ... | ... |
| 121,275 | „ | Dec. 19 | 4 | 4 | Do. 4 p.c. Deb. | 100—105 | ... | 103 |
| 350,000 | „ | Mar. 6 | 9/- | 5½ | Swansea 5½ p.c. Red. Pref. | 108—112 | ... | ... |
| 200,000 | „ | Dec. 19 | 6½ | 6½ | Do. 6½ p.c. Red. Deb. | 105—110 | ... | ... |
| 1,076,490 | „ | Mar 6 | 6½ | 6½ | Tottenham and District Ord. | 142—147 | ... | ... |
| 300,000 | „ | „ | 5½ | 5½ | Do. 5½ p.c. Pref. ... | 118—123 | ... | ... |
| 199,005 | „ | Dec. 19 | 4 | 4 | Do. 4 p.c. Deb. ... | 98—103 | ... | ... |
| 85,701 | „ | Sept. 19 | 6 | 6 | Tussan, Ltd., 6 p.c. Red. Db. | 75—80 | ... | ... |
| 347,769 | „ | Mar 6 | 7 | 7 | Uxbridge, &c., 5 p.c. ... | 135—140 | ... | ... |
| 88,330 | „ | „ | 5 | 5 | Do. 5 p.c. Pref. ... | 108—113 | ... | ... |
| 1,322,220 | „ | Mar. 6 | 7 | 7 | Wandsworth Consolidated | 142—147 | +2 | 143½—146½ |
| 1,096,378 | „ | „ | 5 | 5 | Do. 5 p.c. Pref. ... ... | 112—117 | ... | 117 |
| 1,317,964 | „ | Dec. 19 | 5 | 5 | Do. 5 p.c. Deb. ... ... | 120—125 | ... | 123½—124 |
| 158,400 | „ | Mar. 6 | 5 | 6A | Winchester W. & G. 5p.c. Con. | 105—110 | ... | ... |

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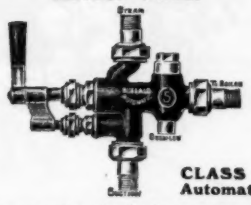

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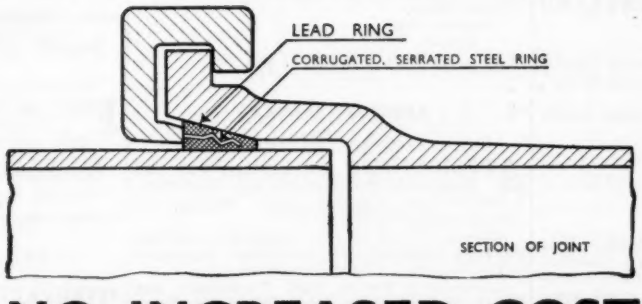


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**APPLICANTS for the Vacancy of the** above are THANKED for their Applications, and are notified that AN APPOINTMENT HAS NOW BEEN MADE.

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Applications (stating age, qualifications, experience, present and previous appointments, and accompanied by *copies* of not more than Three recent Testimonials) must be delivered to the undersigned on or before Wednesday, the 19th April next.

WILLIAM HENRY TYRER,
Town Clerk.

Town Clerk's Office,
Municipal Buildings,
Wigan,
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Tenders, to be endorsed "Tender for Coal," to be addressed to the Chairman of the Gas Committee, North Street, Gainsborough, on or before 13th April, 1933.

C. E. BYRT,
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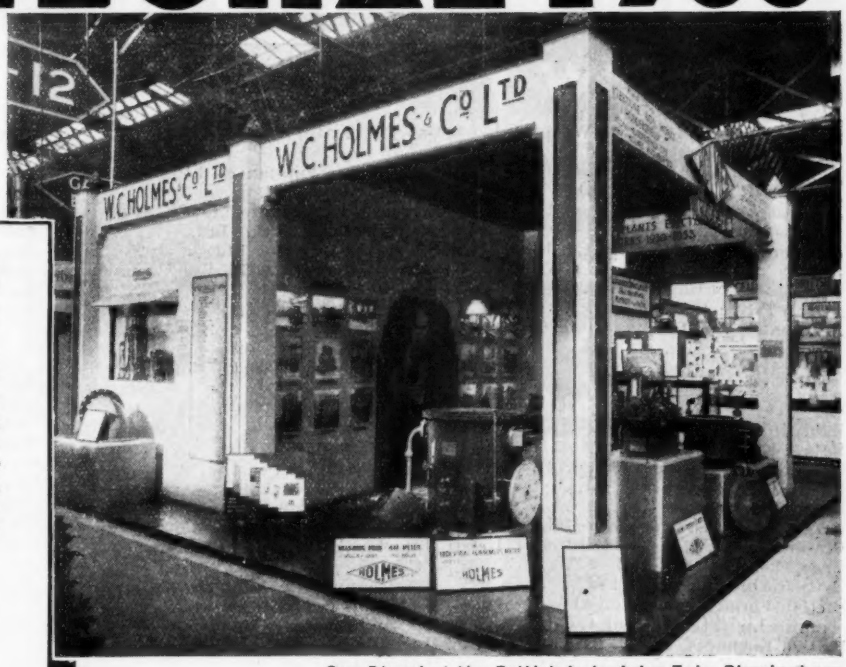


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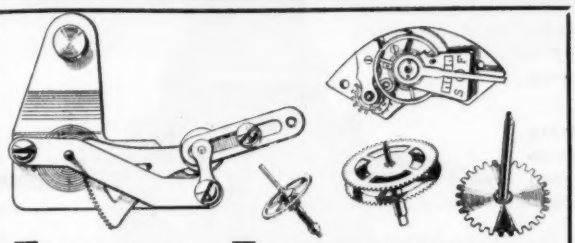

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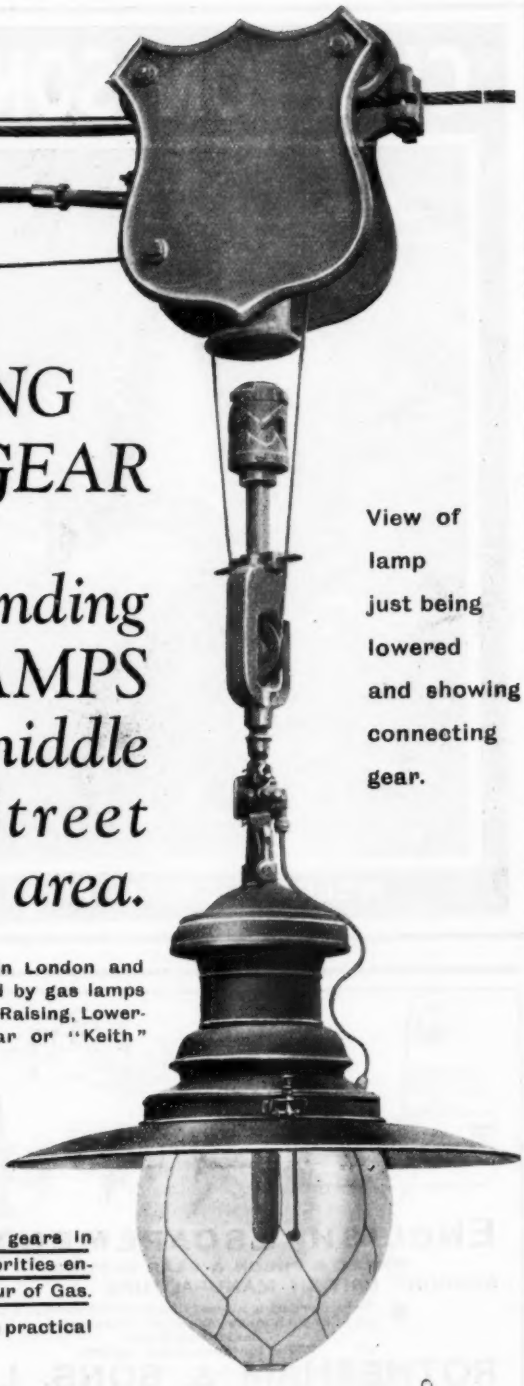

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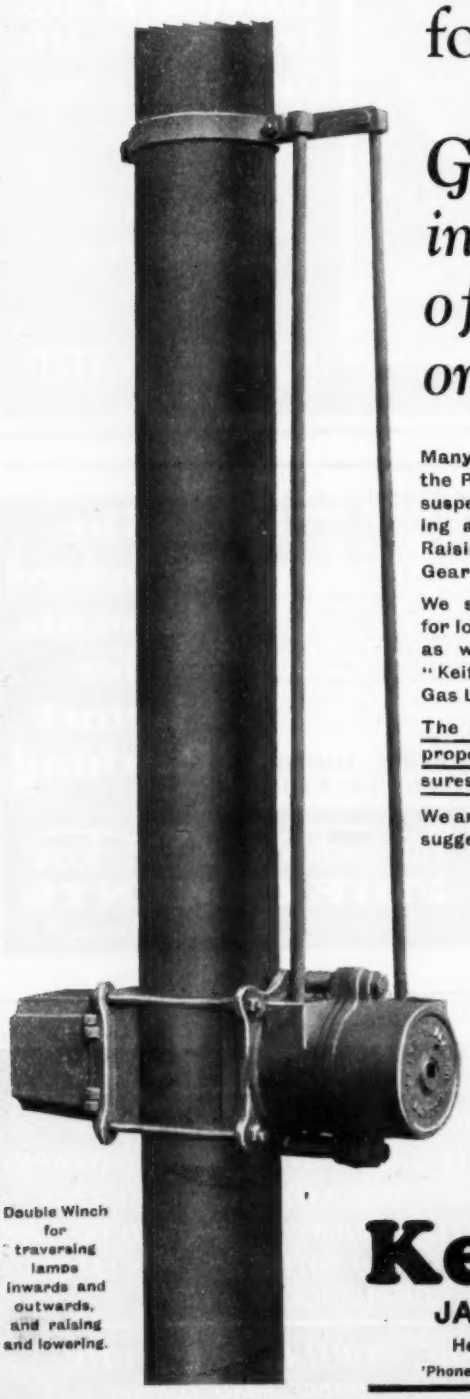

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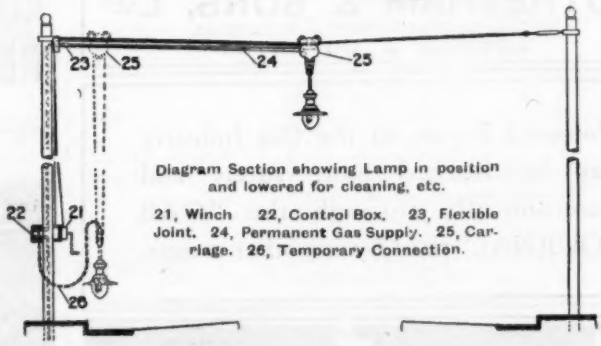


Diagram Section showing Lamp in position and lowered for cleaning, etc.

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